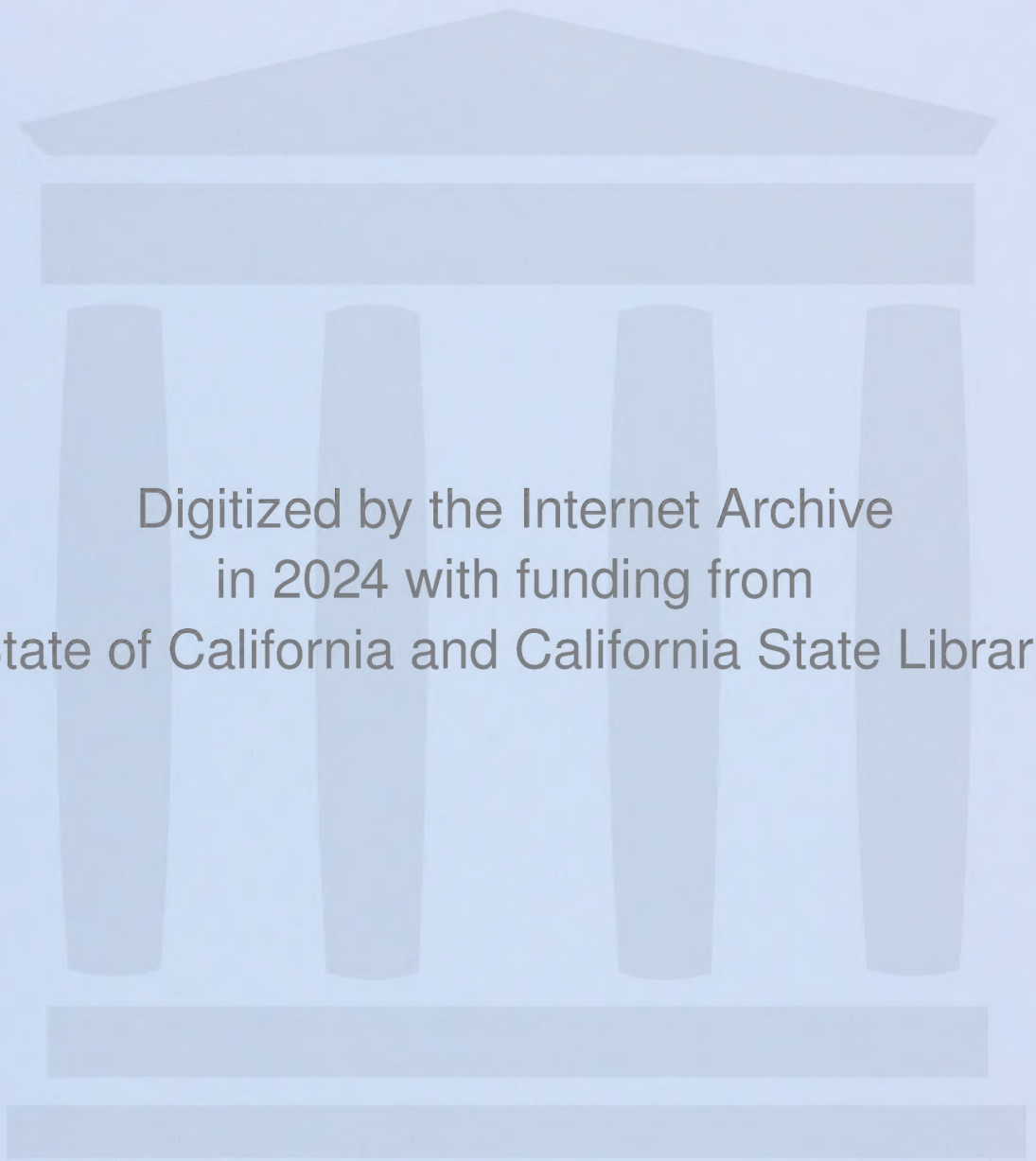
BAY AREA
'91 CLEAN AIR PLAN

VOLUME II

APPENDIX F
TRANSPORTATION CONTROL MEASURE DESCRIPTIONS

October 1991

Prepared by
Bay Area Air Quality Management District
in cooperation with
Metropolitan Transportation Commission and
Association of Bay Area Governments



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Transportation Control Measure Descriptions

Introduction

The 1991 Clean Air Plan (CAP) describes the role of transportation control measures (TCMs) in the Bay Area CAP. It summarizes the transportation requirements in the California Clean Air Act, why TCMs are needed, the organization of the TCMs (Phase 1 and Phase 2), TCM implementation issues, and projected results of the TCMs in reducing motor vehicle emissions and vehicle travel.

This Appendix describes the process used to develop the TCM plan, the basic principles that support the TCM plan, linkages among TCMs, and revisions to the draft TCM plan. It also provides a 2 to 6 page description of each TCM.

Process to Develop TCMs

The Metropolitan Transportation Commission (MTC) was given primary responsibility to develop transportation control measures for the Bay Area. MTC formed a TCM Task Force in April 1989 to help develop the TCM plan. The Task Force consisted of representatives from local governments, employers, developers, environmental groups, the Air District, and other interested parties. MTC contracted with the consulting firm of Deakin, Harvey, Skabardonis (DHS) to analyze the emission reduction potential of the TCMs. DHS used the STEP model to estimate the travel effects of the TCMs and EMFAC7E to estimate emission reductions.

MTC adopted the TCM plan in late November 1990 and submitted it to the Air District in December. Air District staff reviewed MTC's plan, made several modifications, and submitted the revised TCM plan to the BAAQMD Board of Directors in January 1991. The Board determined that the revised TCM plan should be incorporated into the draft Clean Air Plan (CAP). The draft CAP was released for public review in April 1991.

The Air District received many comments and suggestions on the TCMs in public hearings and comment letters. The District has revised the TCM plan in response to those comments. For a summary of the revisions, see below under Revisions to Draft TCM Plan.

Basic Principles

The TCM plan is based on several principles which recognize that fundamental changes are needed to achieve long-term improvements in regional air quality. These principles include:

1) Land use and transportation decisions must be more closely linked in order to reduce dependence on motor vehicles.

2) Pricing reforms must provide a "level playing field" where alternative transportation modes can better compete with the automobile.

3) People travel to fulfill diverse needs--efforts to reduce motor vehicle travel cannot succeed unless people have access to a range of viable transportation options.

4) Strategies to reduce mobile emissions must be closely integrated with efforts to reduce traffic congestion, including local Congestion Management Programs.

5) Transportation control measures should focus on reduction of motor vehicle trips. Since short trips produce significant emissions after a "cold start," TCMs must emphasize reduction of vehicle trips of all lengths.

6) Transportation demand management to improve the efficiency of the existing transportation network must be the focus of efforts to solve our air quality and transportation problems, rather than transportation projects that stimulate increased travel.

Linkages Among TCMs

The TCMs are designed to function as an integrated plan. Individual measures support and reinforce one another. For example, the effectiveness of the new rail starts program (TCM 4) will be enhanced by TCM 5 (improve access to rail stations), TCM 13 (expanded marketing of transit passes, improved coordination of service among transit systems), and TCM 18 (zoning for higher density near transit stations).

The TCMs fall into several functional categories.

Mobility Improvements

Mobility measures are designed to enrich transportation options for Bay Area residents. They include measures to:

- improve and expand public transit, including bus, rail and ferry (TCMs 3, 4, 6, 7, 13);
- improve access to transit stations (TCM 5);
- improve bicycle access and facilities (TCM 9);
- expand high occupancy vehicle (HOV) lanes on freeways and expressways (TCM 8);
- improve youth transportation (TCM 10).

Trip Reduction Programs

Trip reduction measures are designed to reduce motor vehicle trips to worksites and other facilities. TCM 2 is based on BAAQMD adoption of a regional employer-based trip reduction rule to reduce vehicle trips for commute purposes. TCM 1 consists of measures by public sector agencies to provide support and assistance to employer trip reduction programs. TCM 16 addresses (non-work) indirect sources facilities that attract vehicle trips, such as universities, airports, arenas, residential developments, shopping centers and other commercial facilities. BAAQMD will adopt regional indirect source control (ISC) rules for new and existing indirect sources. The District will delegate implementation of both the employer-based trip reduction rule and the indirect source control rules to cities and counties.

User Incentives

User incentives are designed to increase ridesharing and transit use by reducing cost, improving travel time, and increasing convenience. They include measures to reduce transit fares, to improve coordination of service between transit operators, and to expand the distribution and marketing of transit passes (TCM 5 & 13). Employers will be encouraged to provide subsidies to employees who commute via ridesharing and transit (TCMs 2, 13, 15). User incentives to promote ridesharing include an expanded HOV lane system and preferential parking for carpools and vanpools.

Revenue Measures

Additional revenue is needed in order to fully implement many of the TCMs. MTC estimates the funding shortfall at $500-$600 million per year, primarily for mobility improvements and user incentives. Preferred sources for additional revenue are increases in bridge tolls, gas taxes, and motor vehicle registration fees. TCM 21 contains a set of proposed revenue measures to be implemented in Phases 1 and 2, pending approval of the necessary legislation. Although these measures will reduce vehicle trips and vehicle miles traveled (VMT) by increasing the cost of driving, their primary purpose is to generate revenue to fund mobility improvements.

Market-based Pricing Measures

TCM 22 consists of market-based pricing measures specifically designed to reduce motor vehicle use by increasing the cost of driving. Proposed pricing measures include increased fuel taxes, congestion pricing on major roadways, increased vehicle registration fees based on emissions and miles driven, and parking fees for both work and non-work sites. Congestion pricing focuses on reducing congestion by decreasing peak period demand on key facilities.

TCM 22 recognizes that pricing measures to increase the variable costs of driving are more effective than measures that increase the fixed costs of owning and operating a motor vehicle. In addition to reducing and rationalizing vehicle use, pricing measures will be a key source of revenue to implement mobility improvements. BAAQMD will pursue the State legislation required to authorize market-based TCMs, including the establishment of a specific fund and/or programs to mitigate economic impacts on low income households.

Traffic Operations

These measures (TCMs 12 and 13) are designed to improve the flow of traffic on freeways and major arterials. They will reduce emissions related to congestion and stop-and-go driving. Unlike the other TCMs, traffic operations measures are expected to result in a slight increase in total trips and VMT.

Land Use / Transportation Linkages

Land use policies and site design are critical in determining the need for vehicle trips, as well as availability and choice of transportation mode. Pursuant to its indirect source control authority, the District (or a delegated local agency) will review site design plans for new development to ensure transit, bicycle and pedestrian access and to reduce the need for motor vehicles.

The TCM plan also contains measures to encourage local land use policies that will contribute to solving air quality and transportation problems. These linkages are addressed in TCMs 18 (higher density zoning near transit stations) and TCM 19 (air quality elements for general plans).

Local Congestion Management Programs (CMPs) to reduce traffic congestion will play an important role in shaping the region's transportation and land use patterns. Although the CMP legislation does not mandate that local CMPs be consistent with regional air quality plans, these programs clearly have the potential to make a significant impact on air quality. BAAQMD will work with local agencies to promote consistency between the Clean Air Plan TCMs and Congestion Management Programs.

Intermittent Measures

TCM 23 is a voluntary measure which asks the public to curtail driving on days when an ozone exceedance is predicted. This measure is related to the public education campaign (TCM 17) described below.

Support Measures

Support measures that are critical to successful implementation of the TCM plan include public education (TCM 17); demonstration projects in areas such as telecommuting and automatic toll collection (TCM 20); and pursuit of legislation needed to implement TCMs.

BAAQMD recognizes that public support is critical to the success of the Clean Air Plan, particularly the transportation control measures. The Air District has launched a public education campaign with the theme of "Clear Choices for Clean Air." This campaign focuses on informing Bay Area residents about simple ways that they can help to improve air quality. The District is seeking funds to continue and expand the public education effort throughout the CAP implementation process.

BAAQMD will seek legislation needed for implementation of revenue measures (TCM 21) and pricing measures (TCM 22). The District also supports legislation to require cities and counties to prepare air quality elements for their general plans; approval of this legislation would facilitate implementation of TCM 19.

BAAQMD will strive to coordinate TCMs and indirect source control programs with local Congestion Management Programs (CMP) and other related efforts. Legislation may be needed to facilitate effective linkages and coordination of CMPs with the Indirect Source Control program.

Revisions to Draft TCM Plan

In response to comments on the draft CAP received in public hearings and comment letters, the Air District has made several revisions to the TCMs. The major revisions are summarized below:

1) Phase 3 has been deleted because TCM 22 (Market-based Pricing Measures) has been shifted from Phase 3 to Phase 2. The decision to expedite pricing measures is based on their potential to achieve substantial reductions in motor vehicle emissions, vehicle trips and VMT, as well as widespread support for these measures among business and environmental groups.

2) TCM 21 (Implement Revenue Measures) has been shifted from Phase 2 to Phase 1. This change was made in order to generate additional revenue to fund TCM implementation at the earliest possible date. Legislation to implement increased bridge tolls (SB 210) and vehicle registration fees (AB 434) is pending in Sacramento; prospects are good for approval in the 1991-1992 session. However, additional legislation is still needed to increase gas taxes.

3) Adoption of a regional employer-based trip reduction rule has been accelerated to July 1992. This change will facilitate coordination of the Air District's trip reduction rule with the local trip reduction ordinances that are being developed in response to congestion management requirements.

4) Adoption of an indirect source rule for existing sources has been scheduled for 1994 rather than 1993. This change is made to allow adequate time to develop this controversial rule and is consistent with the expeditious adoption schedule described in Section 4 and Appendix A of the CAP.

5) An intermittent voluntary "no drive days" measure (Control measure G3 in the draft CAP) has been removed from the Stationary Source Control Measures and added to the TCM plan as TCM 23. This measure aims for voluntary reduction in vehicle use on days of predicted ozone excesses.

6) The section in TCM 15 which calls for 24 hour free tolls for high occupancy vehicles (HOVs) on all bridges has been deleted. This element was deleted in recognition of the fact that the primary motivation for using HOV lanes is the time saved in bypassing congested toll plazas, not the free toll. Providing a free toll for HOVs during non-peak periods would reduce revenue that can be used to improve transit service, while providing little additional stimulus for ridesharing.

7) A goal for increased bicycle mode share for the commute period has been added to TCM 9. This change was made in recognition of the fact that, as a low cost, pollution free vehicle, the bicycle can play a significant role in regional transportation, given proper support by the public and private sectors.

Transportation Control Measure Descriptions

Descriptions of TCMs 1 through 23 follow. Each TCM is described according to the following format: purpose, background, description, travel market affected, emission reductions, implementation, and other impacts. These TCMs incorporate the TCMs adopted by MTC in February, 1990 as contingency measures for the 1982 Bay Area Air Quality Plan. The Contingency Plan TCMs are referred to in the text of the TCMs as Federal TCMs.

TCM #1 - EXPAND EMPLOYER ASSISTANCE PROGRAMS

Purpose

This TCM will expand and enhance programs to provide public sector support for employer-based trip reduction programs. These efforts are important, both to support employers which are already implementing trip reduction programs, and to assist employers when they become subject to employer-based trip reduction rules, as described in TCM #2.

Background

Employer-based trip reduction is a relatively new strategy to combat air pollution and traffic congestion. Many initiatives are being tested within the region and around the State. It is important that public agencies support employer trip reduction efforts throughout the region.

This TCM will help to monitor the effectiveness of various trip reduction measures, to promote the exchange of information among employers, and to stimulate innovative programs.

Description

A sustained employer effort must be an integral part of a successful TCM plan. This measure provides new ways to support ongoing efforts by establishing, through the public sector, additional programs and sources of information for use by employers.

TCM #1 includes the following activities and programs:

- Identify high visibility companies which can act as "pacesetters" or models for effective commute alternatives programs (Federal TCM 23).
- Provide assistance in establishing transportation management associations, particularly those oriented toward the needs of smaller employers.
- Develop information for use by employers in evaluating telecommuting opportunities.
- Survey selected employers over several years to determine how their employee commute patterns are changing and the reasons for those changes.
- RIDES, Commuter Network and other ridesharing organizations will provide training for Employer Transportation Coordinators.
- RIDES will provide an expanded training and education program through workshops for employer program managers and city and county TSM coordinators.
- RIDES will assist trip reduction efforts at major employers by providing on-site consultations and informational mailings, supporting company vanpool programs, and promoting sales of transit tickets (see TCM 13).

- Provide information to employers for establishing telecommuting programs (see also TCM 20).

Travel Market Affected

This measure primarily addresses commute travel between home and work, which accounts for 25% of vehicle trips, 33% of vehicle miles traveled and 27% of mobile emissions in the Bay Area. In addition to commute trips, TCM 1 may also help to reduce other work-related vehicle trips, such as lunch hour errands.

Effectiveness

TCM 1 is expected to yield the following emission reductions, beginning in Phase 1:

RHC	NOx	CO
0.18%	0.18%	0.17%

TCM #1 may indirectly promote additional reductions by providing information and experience that can be used in developing effective trip reduction programs at new locations.

Cost

The major costs associated with TCM 1 are additional funding for RIDES and other ridesharing programs to expand their employer assistance programs. Annual cost is estimated at $975,000.

Implementation

Implementation of TCM #1 will require cooperation between MTC, regional ridesharing agencies, Congestion Management Agencies, city and county TSM managers, employer associations, etc. The primary role of MTC and the Air District will be to encourage and coordinate the many initiatives and programs that are either underway or planned around the region. Caltrans has significantly increased its funding for ridesharing programs throughout the state over the past several years, and is expected to continue to provide a strong level of support in future years. Additional funding may be available through AB 434. Many of the activities described above are already included in RIDES' 1991-92 work plan.

Impediments

There are no significant obstacles to implementation of TCM #1. The main issue may be assuring efficient coordination of effort between the public and private sectors, and promoting cooperation among public sector agencies.

Other Impacts

In addition to reducing emissions, TCM 1 will reduce vehicle trips and vehicle miles traveled. Since most commute travel occurs during peak periods, this measure offers an important means to mitigate traffic congestion. TCM 1 is expected to provide travel time benefits valued at $6 million per year, far in excess of estimated implementation costs. Other impacts include reduced fuel consumption, reduced wear and tear on motor vehicles and the regional road network, reduced carbon dioxide emissions (CO2), and reduced water pollution.

TCM # 2: EMPLOYER-BASED TRIP REDUCTION RULE

Purpose

This TCM will require employers to implement trip reduction programs to reduce motor vehicle trips and vehicle miles traveled for commute purposes.

Background

Trip reduction programs are already well established in the Bay Area. Since 1984, at least twenty cities and counties in the Bay Area have adopted local trip reduction ordinances. In most cases, these ordinances require employers to implement trip reduction programs in order to reduce commute travel. Also, many employers which are not currently subject to TROs have developed trip reduction programs on a voluntary basis.

In June 1990, California voters approved Proposition 111 to increase state gas taxes and provide funding for transportation projects. Companion legislation requires each county to develop a Congestion Management Program, including a travel demand element, and each city and county to adopt a trip reduction ordinance.

The California Air Resources Board has determined that employer-based trip reduction rules are a "reasonably available transportation control measure" under the provisions of the California Clean Air Act.

Description

- MTC has developed a "model" trip reduction ordinance to provide guidance for cities and counties that are developing trip reduction programs in response to Congestion Management Program requirements (Federal TCMs 27 and 28).

- BAAQMD will adopt a rule to require employers to implement trip reduction programs to achieve average vehicle ridership (AVR) performance standards. Specific provisions of the rule will be determined during the District's rule-making process.

- BAAQMD will delegate implementation of the regional trip reduction rule to cities and counties which meet the District's objectives, but the District will implement the rule if local jurisdictions do not.

In developing a regional trip reduction rule, BAAQMD will attempt to build on existing local trip reduction ordinances and the congestion management programs which are currently being developed.

Travel Market Affected

This measure focuses on commute travel between home and work, which accounts for about 25% of vehicle trips, 33% of vehicle miles traveled, and 27% of mobile emissions in the Bay Area. In addition to home to work commute travel, this TCM should help to reduce work-related midday travel, such as vehicle trips during the lunch hour.

Effectiveness

The actual level of emission reductions achieved will depend upon the final shape of the rule in terms of performance standards, employer size threshold, enforcement mechanisms and upon success in implementing the rule.

For modeling purposes to estimate potential emissions reductions, the following assumptions were made:

- that the rule will operate on 75% of the workforce region-wide
- that, after a transition period, employers develop programs equivalent to a $3.00 per day parking charge on single occupant vehicles and provide subsidies for ridesharing, transit, and other alternatives to drive alone commuting.

Based on the above assumptions, TCM #2 is expected to yield the following emission reductions:

RHC	NOx	CO
3.57%	3.67%	3.76%

In addition to the shape of the rule, many external factors will also influence the effectiveness of this measure. These include the price of gas, availability of funding to expand transit in the region, and potential changes in State and Federal tax policy regarding employer subsidies for parking and transit.

Cost

This measure will impose administrative costs on BAAQMD or local governments which implement the rule. The estimated region-wide cost for implementing agencies is $5 million per year.

A regional trip reduction rule will also impose administrative and program costs on employers which are subject to the rule. Costs may vary significantly among employers. Employers which opt to implement parking charges might choose to use parking revenues to offset program costs. Estimated administrative costs for the employer are $50 per employee per year, for a region-wide total cost of $150 million per year.

Administrative expenses for BAAQMD or cities and counties which are implementing the trip reduction rule may be offset by requiring employers to pay a filing fee to cover the costs of reviewing plans. Filing fees would shift the cost of reviewing and approving trip reduction plans from government to business.

Implementation

BAAQMD's trip reduction rule will be developed through workshops and consultation with interested parties. Performance standards in the rule will be designed to help achieve a regional average vehicle occupancy rate of 1.5 during peak commute periods by 1999, as required by the California Clean Air Act. However, in setting performance standards, the rule will be sensitive to regional variation in terms of density of population and employment and access to transit.

The rule will be flexible to permit employers to design programs that are appropriate for local conditions. Employers will be encouraged to use parking pricing, combined with monetary incentives for transit and ridesharing, as an option to comply with the goals of the trip reduction rule.

The California Clean Air Act allows air districts to delegate implementation of control measures to local agencies, subject to specified criteria. To avoid redundancy or conflict with local trip reduction ordinances, BAAQMD will pursue implementation of the regional rule through delegation agreements with cities and counties. Funding for cities and counties may be available through AB 434.

Schedule:

Air District's schedule for implementation:

Begin rule development	1991
Hold workshops	1992
Adopt rule	1992
Delegation agreements	1992-93
Implementation	1993

Impediments

Many issues must be addressed in defining a regional trip reduction rule, and in the subsequent phases of implementing and monitoring trip reduction programs. The key implementation issue is developing delegation agreements between BAAQMD and cities and counties.

Other Impacts

The costs of implementing trip reduction programs should be offset to a significant extent by savings that accrue to employees when trips are shifted from single occupant vehicles to transit and ridesharing. Potential savings to employees include reduced fuel consumption, as well as reduced vehicle depreciation and maintenance costs.

This measure will help to reduce traffic congestion, especially since commute travel dominates the congested morning and evening peak periods. Travel time savings are estimated at $110 million per year. Additional benefits to society as a whole include higher levels of transit use, less need for expansion of roads and freeways, reduced wear and tear on the existing highway infrastructure, energy conservation, and reduced carbon dioxide (CO2) emissions.

Although TCM #2 will reduce vehicle use overall, it may cause an increase in vehicles driving to and from transit facilities, such as BART stations and ferry terminals. This could create or aggravate local carbon monoxide (CO) "hot spots."

In areas where employers choose to impose parking fees to reach the performance standards in TCM #2, there is potential for spill-over of employee vehicles from company parking lots to on-street parking adjacent to the worksite. This may require implementation of local mitigation programs, such as residential parking permits, installation of parking meters with time limits, and vigorous enforcement of parking regulations.

TCM #3 - IMPROVE AREAWIDE TRANSIT SERVICE

Purpose

This TCM will help to reduce motor vehicle trips, vehicle miles traveled, and mobile source emissions by providing improved transit service throughout the Bay Area.

Background

The overall goal of the TCM plan is to reduce vehicle trips, vehicle miles traveled, and vehicle idling. Therefore, we must provide people with viable transportation alternatives to the private automobile. The centerpiece of the TCM plan is a package of mobility measures, which includes all or part of TCMs 3 through 15. TCM #3 will improve and expand transit service on a region-wide basis.

Description

TCM #3 includes the following elements:

Phase 1

- continuation of post-earthquake expansion of BART service (Federal TCM 17b);
- extending Caltrain to Gilroy and expanding service from 54 to 66 trains per day (Federal TCM 19);
- encouraging transit operators to conduct comprehensive analyses of markets, routes, and schedules, including market for subscription bus service at major employment centers;
- encourage transit operators to convert bus fleets to clean fuel vehicles.

Phase 2

- implementation of rail service improvements contained in rail operators' Short Range Transit Plans,
- an overall 33% increase in local bus service region-wide.
- further expansion of bus and rail service dependent upon level of funds available from market-based measures (see TCM #22).

Travel Market Affected

This measure should affect all intra-regional travel, including commute travel, shopping, personal business, social and recreational travel, and school trips.

Effectiveness

TCM #3 is expected to yield the following emission reductions:

	RHC	NOx	CO
Phase 1	0.46%	0.46%	0.44%
Phase 2	1.00%	0.90%	0.90%
Total	1.46%	1.36%	1.34%

Emission reductions from potential improvements funded by market-based TCMs cannot be determined until the level of funding has been established.

Cost

Funding for Phase 1 elements is already available. The cost to implement Phase 2 elements of TCM 3 is estimated at $240 million; this includes $100 million for rail service expansion and $140 million for bus service expansion.

Implementation

Implementation of TCM #3 requires cooperation between MTC and all transit operators in the region. MTC funds and reviews transit operator comprehensive service plans.

Expansion of Caltrain service and extension of Caltrain from San Jose to Gilroy will require success in negotiating a long-term operating agreement for Peninsula rail service and in purchasing the rail corridor from Southern Pacific.

Full implementation of TCM #3 is contingent upon approval of legislation to provide additional revenue to fund the Phase 2 mobility improvements. MTC and the Air District will cooperate to seek approval for a set of revenue measures based on higher bridge tolls, and increased gas taxes and vehicle registration fees, in order to generate revenues of $500-$600 million per year for mobility improvements (see TCM 21).

Impediments

Approval of legislation to create additional funding for mobility improvements is the major obstacle to full implementation of the Phase 2 elements in TCM #3.

Other Impacts

In addition to reducing emissions, TCM #3 is expected to yield $66 million per year in travel time savings by reducing traffic congestion. Other benefits include reduced need for additional road capacity, savings on wear and tear on both roadways and motor vehicles, and improved quality of life for Bay Area residents due to improved transportation options

TCM #3 will have an overall net benefit in terms of air quality. However, it may result in increased vehicle trips to and from transit stations and in increased use of buses, which could have a negative impact on local air quality in the vicinity of transit stations and on heavily traveled bus routes. Acquisition of new, cleaner buses and improved access to transit stations via walking, bicycling and shuttle buses (see TCM 5) should help to mitigate these potential negative local impacts.

TCM #4 - EXPEDITE AND EXPAND REGIONAL RAIL AGREEMENT

Purpose

This TCM will reduce motor vehicle trips, vehicle miles traveled and mobile source emissions by promoting rail extensions on the BART, Tasman light rail and Caltrain systems.

Background

In order to reduce motor vehicle travel and mobile emissions, we must provide Bay Area residents with viable transportation alternatives to the private automobile. TCM #4 is a mobility improvement measure, spanning both phases of the TCM plan. This measure is based upon MTC's New Rail Starts Program, as outlined in MTC Resolution 1876.

TCM #4 will be of particular benefit to fast-growing areas of the region which are currently poorly served by public transportation, including Contra Costa County and southeastern Alameda County. It will also help to reduce congestion on the heavily traveled Hwy 101 corridor on the Peninsula and vehicle trips to San Francisco International Airport.

Description

Phase 1

- BART extension from Daly City to Colma (Federal TCM 16).

Phase 2

- Extension of BART lines to:

  Dublin
  San Francisco International Airport (4 or 5 stations)
  West Pittsburg (2 station extension)
  Warm Springs in Fremont (2 station extension)

- Extension of Caltrain to a downtown terminus in San Francisco

- Extension of Tasman light rail system in Santa Clara: 12 miles; 19 stations.

- Further extension of regional rail systems, dependent upon demand and the level of funding available through the market-based measures (see TCM #22).

Travel Market Affected

This measure would affect all types of intra-regional travel, including commute travel, shopping, personal business, social and recreational trips, school trips, and travel to San Francisco Airport.

Effectiveness

TCM #4 is expected to yield the following emission benefits:

	RHC	NOx	CO
Phase 1	0.06%	0.06%	0.06%
Phase 2	0.80%	0.70%	0.80%
Total	0.86%	0.76%	0.86%

Emission reductions from potential projects funded by market-based TCMs cannot be determined until the level of funding has been established and specific projects identified.

The effectiveness of TCM #4 in reducing vehicle travel and emissions depends in part upon success in developing land use policies that complement transit, such as zoning policies that encourage denser development in the vicinity of transit stations (see TCM 18).

Cost

Approximately 80 percent of the funding for Phases 1 and 2 is available through existing funding sources. If legislation is approved to fund Phase 2 mobility improvements, a portion of this additional revenue could be used to accelerate construction of the rail extensions in Phase 2.

Implementation

MTC is working with BART, Caltrain and Santa Clara County Transit to implement the New Rail Starts program. MTC updates the New Rail Starts plan and analyzes the region's financial capacity on an annual basis. Funding for the New Rail Starts program is based upon a combination of Federal aid, State funding via Props 108 and 111, and local sales tax revenues. Approval of federal funding for the extension to San Francisco Airport is critical to the financing plan for the entire package of BART extensions.

The current schedule calls for completion of the BART extension to Dublin in 1995, to Colma in 1996, to West Pittsburg and Warm Spring in 1997, and to San Francisco Airport in 2001. The Tasman Light Rail project is scheduled for completion in 1996.

The Caltrain extension to downtown San Francisco is scheduled for 1995; however, this proposal is still under study. This extension depends upon agreement as to the best location for a downtown terminus, as well as success in developing a long term operating agreement for Caltrain and purchasing the Peninsula corridor from Southern Pacific (see TCM 3).

Impediments

Most funding for the Phase 2 projects in TCM #4 has been approved. However, approval of Federal funds for the BART extension to San Francisco Airport is critical. Acceleration of the construction schedule is contingent upon obtaining additional funding through the Phase 2 revenue measures (see TCM #21).

Other Impacts

In addition to reducing emissions, TCM #4 is expected to yield $44 million per year in travel time savings by reducing traffic congestion. Other benefits include reduced need for additional road capacity, reduced wear and tear on both roadways and motor vehicles, and improved quality of life for Bay Area residents due to improved transportation options.

Although TCM #4 will improve the region's overall air quality, it may have negative impacts on a localized basis. Emissions due to construction may cause a short-term negative impact on air quality. Also, motor vehicle trips to the new transit stations may increase local carbon monoxide levels in some areas. Mitigation of the latter impact can be achieved through measures that promote the use of walking, bicycling, and shuttle buses to access transit stations.

TCM #5 - IMPROVE ACCESS TO RAIL AND FERRIES

Purpose

TCM #5 will reduce motor vehicle trips and vehicle miles traveled by improving access to rail and ferry systems. This measure will complement TCMs 3, 4, 6 and 7.

Background

The Bay Area is committed to a major expansion of transit service at an eventual cost of several billion dollars. Supporting measures that promote access to transit are needed to ensure that the region gets full return on this large investment.

There are many competing uses for funds to enhance access to transit. Therefore, these funds must be allocated to projects that have the greatest potential to increase ridership and improve air quality. From the standpoint of air quality, it is critical to reduce motor vehicle trips. Because of the "cold start" effect, much of the potential air quality benefit is lost if transit patrons drive to the station. For this reason, emphasis should be placed on access improvements that promote alternatives to the automobile, wherever this approach is feasible.

Description

TCM #5 provides for significant improvements in rail and ferry access through the following strategies:

- increase local and express feeder bus services to rail and ferries
- improve bicycle access (e.g. bike paths, adequate curb lane widths for bicycles on roadways, storage facilities)
- develop private shuttles to employment centers
- increase parking
- encourage BART and Caltrain to provide preferential parking for electric vehicles

Travel Market Affected

TCM #5 will affect all types of trips, including commute travel, shopping, personal business, social and recreational travel, and school trips.

Effectiveness

TCM #5 is expected to yield the following emission reductions:

	RHC	NOx	CO
Phase 1	0.02%	0.02%	0.03%
Phase 2	0.30%	0.30%	0.25%
Total	0.32%	0.32%	0.28%

Cost

Total cost is estimated at $50 million per year to subsidize services that provide improved timed-transfer access to mass transit.

Implementation

Implementation of TCM #5 will require cooperation between MTC, bus and rail operators, and private sector (employers, developers, etc).

MTC will review comprehensive rail access plans to be prepared by transit operators; such plans will recommend the most cost-effective access improvements and will consider the feasibility of parking charges as a source of revenue for expanded feeder bus service or other access improvements.

MTC will allocate funds under its control consistent with the rail access plans. AB 434 funds may be available for local feeder bus or shuttle service.

The San Francisco Bay Area Ferry Plan prepared for the City of Vallejo and MTC contains recommendations for improving feeder bus service to ferries.

RIDES will be funded to work with transit operators and employers to establish private shuttle service for interested major employers.

Caltrain has an existing program to work with employers in setting up shuttles to employment sites that are located near Caltrain stations.

Elements that can be implemented with existing funding sources are included in Phase 1. Elements which require additional funding are included in Phase 2.

Impediments

Full implementation of TCM #5 will require approval of legislation to provide revenue to fund the mobility package (see TCM 21).

Other Impacts

In addition to reducing emissions, TCM #5 is expected to yield $17 million per year in travel time savings by reducing congestion. Other benefits include reduced fuel consumption, reduced wear and tear on motor vehicles and roadways, and enhanced transportation options for residents of the Bay Area.

TCM #5 will be especially beneficial to the transit dependent population in the region.

Although TCM #5 will improve the region's overall air quality, it may have negative impacts on a localized basis. There are potential short-term impacts from construction-related emissions due to expansion of parking facilities. There are also potential impacts due to an increase in vehicle trips from expanded feeder and shuttle bus service at transit stations and increased vehicles using expanded parking facilities. Potential impacts can be mitigated by promoting the use of low emission buses and by emphasizing access improvements that promote alternatives to the private automobile.

TCM #6 - IMPROVE INTERCITY RAIL SERVICE

Purpose

TCM #6 will reduce motor vehicle travel and mobile source emissions by providing regular intercity rail service in the Auburn-Sacramento-Oakland-San Jose corridor.

Background

The I-80 corridor between the Bay Area and Sacramento is one of the most heavily traveled and fastest growing corridors in northern California. Existing AMTRAK service between Oakland and Sacramento is limited to two trains per day and the hours of service are inconvenient. There is currently no direct passenger rail service between Oakland and San Jose. This measure will help to close these major gaps in the transportation network.

Description

Implement new intercity rail service in the Auburn-Sacramento-San Jose corridor as defined in the ACR 132 (Hannigan) Rail Study -- target is 10 round trips per day by 1999/2000.

Phase 1 of TCM #6 incorporates Federal TCM 18 (3 round trips/day).

Travel Market Affected

TCM #6 will affect both inter-regional travel, between the Bay Area and the Sacramento area, and intra-regional travel, primarily in the I-80, I-680 and I-880 corridors. Full implementation of this measure will provide viable service during commute periods.

Effectiveness

TCM #6 is expected to yield the following emission reductions:

	RHC	NOx	CO
Phase 1	0.05%	0.05%	0.04%
Phase 2	0.04%	0.04%	0.03%
Total	0.09%	0.09%	0.07%

Cost

Funding for capital costs to initiate service are already committed. Funding for operating costs must be secured (see below). If legislation to generate revenues for the mobility improvements is approved, $10 million per year might be allocated to the intercity rail service.

Implementation

Implementation of new rail service in the Auburn-Sacramento-San Jose corridor is based upon the ACR 132 (Hannigan) Rail Corridor Upgrade Study which was completed in December 1990.

Propositions 108 and 116 provide capital funding for this rail corridor as follows:

- Proposition 108 - $22.4 million plus additional funds from a statewide rolling stock allocation
- Proposition 116 - $85 million plus additional funds from a $100 million statewide rolling stock allocation.

Additional capital funds must be secured to accomplish a higher level of service in the corridor (10 roundtrips per day).

Institutional arrangements must be established to operate the service and fund the operating costs. Southern Pacific and AMTRAK must reach agreement over use of SP trackage. Caltrans would secure rolling stock and contract with AMTRAK for service.

Operating funds of $7 million per year are available from the State Transportation Planning and Development (TP&D) account. These funds would be augmented by passage of AB8 (Hannigan) in the 91/92 legislative session.

Initial service with three roundtrips per day is scheduled to begin in early 1992, if Caltrans, Southern Pacific and AMTRAK complete an operating agreement. Service will increase in subsequent years according to the following timetable:

Stage 1 (FY 1991-1993) - 3 roundtrips
Stage 2 (FY 1992-1998) - 6 roundtrips
Stage 3 (FY 1999-2000) - 10 roundtrips

Impediments

Details of the financing package are still being negotiated.

Other Impacts

TCM #6 will provide a much needed transportation alternative in the Sacramento to San Jose corridor. This will help to reduce congestion in the heavily traveled I-80 and I-880 corridors. Travel time savings are estimated at $2.5 million per year. Additional benefits include reducing fuel consumption, vehicle wear and tear and depreciation, highway maintenance costs, and carbon dioxide emissions.

TCM #6 will help to improve overall regional air quality. However, because it will increase the number of vehicles accessing rail stations, TCM #6 may increase carbon monoxide concentrations in the vicinity of the stations.

TCM #7 - IMPROVE FERRY SERVICE

Purpose

TCM #7 will reduce motor vehicle travel and mobile source emissions by expanding trans-Bay ferry service.

Background

Freeways and bridges that connect the East Bay and the North Bay to San Francisco are heavily congested. High speed ferry service offers a transportation alternative that is efficient, comfortable and high in aesthetic appeal.

Description

TCM #7 contains several elements:

- Continuation of post-earthquake ferry service between Oakland/Alameda and San Francisco (Federal TCM 17).
- Expansion of existing service on Vallejo to San Francisco route.
- New service between the Richmond and Berkeley areas and San Francisco.
- Potential new service between Harbor Bay Isle (Alameda) and San Francisco (private operator).
- Potential new service between Port Sonoma and San Francisco (private operator).
- Potential service for passengers and cargo between Oakland and San Francisco airports.
- Feeder bus service to provide access to ferries (see also TCM #5).

Travel Market Affected

This measure will focus primarily on peak period commute travel, when congestion on bridges is greatest. It will also provide an additional transportation option for shopping, personal business, and social and recreational trips. Expanded ferry service may also generate tourist trips on midday service.

Effectiveness

TCM #7 is expected to yield the following emission reductions:

	RHC	NOx	CO
Phase 1	0.02%	0.01%	0.01%
Phase 2	0.03%	0.03%	0.02%
Total	0.05%	0.04%	0.03%

Cost

Portions of TCM #7 are already funded (see below). If legislation is approved to provide revenues for the mobility package, $10 million per year could be allocated to facilitate full implementation of TCM #7.

Implementation

MTC is preparing a long range ferry service plan as required by SB 2169 (Kopp). MTC will allocate funds under its control consistent with the long range ferry plan. MTC and the City of Vallejo have commissioned two studies to analyze improvements to existing service as well as opportunities for new service. Both studies are expected to be completed by December 1991 or January 1992. The first study, which focuses on improvements to existing service, has been issued in draft form. This study addresses schedules, boats, terminal improvements, feeder service and ridership projections. Ridership is projected to increase from 2.7 million per year to 4 million per year by the mid-1990's.

Continued service between Oakland/Alameda and San Francisco. is based on 3% of Bridge Reserve funds from MTC, local funding from the City of Alameda and Port of Oakland, and State emergency funds. These subsidies total $750,000.

Proposition 116 provides $10 million for improvements to the Vallejo ferry. Potential improvements include 1) replacing the one existing vessel with two high speed boats, 2) making improvements to the terminal and the parking facilities in Vallejo, 3) developing the Vallejo terminal as a multi-modal transit center for North Bay. These improvements are scheduled to be implemented in the 1994-1997 period.

Harbor Bay Maritime, Inc has applied for a PUC permit to operate ferry service between Harbor Bay in Alameda and San Francisco. Service will begin upon approval of the permit.

A private developer is proposing to initiate high speed ferry service from Port Sonoma (near Novato) to San Francisco. The service, which would not require any public funds, could begin in 1993.

MTC is working with ferry and other transit operators to develop transfer arrangements, including free or low cost transfers and joint passes (see TCM 13).

Impediments

Full implementation of Phase 2 elements requires approval of legislation to provide revenues for mobility improvements (see TCM 21).

State PUC approval is required to initiate new private ferry service.

Other Impacts

By helping to reduce traffic congestion, TCM #7 is expected to yield approximately $1.1 million per year in travel time savings. This measure will also reduce fuel consumption, wear and tear on motor vehicles, and highway maintenance costs.

Expansion of ferry service will enhance the Bay Area's transportation system by providing a transportation option that is both practical and high in aesthetic value. A regional ferry system may help to stimulate the tourist industry throughout the region.

Expanded ferry service will result in additional motor vehicle trips to ferry terminals. Although TCM #7 will help to improve the region's overall air quality, it may increase vehicular emissions around ferry terminals. These impacts can be mitigated by promoting the use of feeder buses, carpools and bicycles to access ferry terminals (see TCM #5).

TCM #8 - CONSTRUCT CARPOOL / EXPRESS BUSLANES ON FREEWAYS

Purpose

This TCM will help reduce vehicle trips, VMT and mobile source emissions by promoting the use of carpools, vanpools and other high occupancy vehicles (HOVs) such as express buses.

Background

Low vehicle occupancy rates are a major cause of the Bay Area's air pollution and traffic congestion problems. The single occupant vehicle is the dominant mode of transportation, especially during peak commute periods, when nearly 90% of cars and trucks carry only the driver. Travel time and cost are the primary factors that influence choice in transportation mode. Although carpools and vanpools can provide a significant cost saving compared to driving alone, they often involve a sacrifice in terms of time required for pick-up and drop-off. By providing a significant time savings for carpools, vanpools and express buses, additional HOV lanes on key freeways and expressways will stimulate formation of carpools and use of high occupancy vehicles.

The California Air Resources Board has defined HOV lane networks as a "reasonably available" transportation control measure under the provisions of the California Clean Air Act.

Description

MTC issued a "Year 2005 HOV Lane Master Plan" in August 1990 which was prepared in cooperation with Caltrans and the California Highway Patrol. This Master Plan will provide the blueprint for construction of additional HOV lanes in the region. The Master Plan calls for a network of 480 lane-miles of HOV lanes upon completion, compared to approximately 80 lane-miles at present. Approximately 220 lane-miles are fully funded in the current Transportation Improvement Program (TIP). This measure includes Federal TCM 20.

Other enhancement to the HOV lane plan need to be developed, such as:

- direct connections between HOV lanes on intersecting freeways
- "slip ramps" allowing direct entry and exit to HOV lanes at key points along freeways
- strategically located park & ride lots for HOV lane users

Increases in certain express bus services should be considered to maximize person carrying capacity of HOV lanes.

Vehicle occupancy needs to be monitored and HOV lane use requirements increased from 2 to 3 people per vehicle if appropriate to maintain travel time advantages.

TCM #8 is a Phase 1 and Phase 2 measure.

Travel Markets Affected

TCM #8 is aimed primarily at commute trips, which account for the majority of trips during the morning and evening peak periods. However, HOV lanes should help to increase average vehicle occupancy for other types of trips (shopping, personal business, school, recreational) that occur during peak periods.

Effectiveness

TCM #8 is expected to yield the following emission reductions:

	RHC	NOx	CO
Phase 1	0.23%	0.22%	0.20%
Phase 2	0.41%	0.40%	0.38%
Total	0.64%	0.62%	0.58%

Costs

Funding for partial construction of HOV Lane Master Plan is already available through several sources, including Proposition 111. If legislation is approved to fund Phase 2 mobility improvements (see TCM 21), a portion of this new revenue could be allocated to expedite construction of the HOV lanes during Phase 2.

Implementation

Funding varies by project, and can include Federal, State and local monies. Approximately $500 million in Proposition 111 funds are available for HOV lane projects in the current TIP, which includes 220 miles of HOV lane-miles.

MTC will conduct additional studies to determine the need for support facilities described above, such as additional park & ride lots, special entrance and exit ramps for HOV lanes, and express bus service.

MTC will coordinate with Caltrans on specific proposals with respect to their design feasibility and potential for funding.

MTC will seek funds for critical regional express bus service needs which would be operated on HOV lanes, such as in the I-80 corridor.

Impediments

Construction of the entire 2005 HOV Lane Master Plan on an expedited schedule will require additional funding. Funding for Phase 2 mobility improvements will require approval of State legislation to provide additional revenues (see TCM 21).

Other Impacts

In addition to reducing emissions, TCM #8 will help to mitigate traffic congestion. Travel time savings from this measure are expected to total about $21 million per year. Additional benefits include reduced fuel consumption, reduced wear and tear on motor vehicles, and reduced highway maintenance costs.

Construction of HOV lanes will create substantial employment in the construction trades over the next 10-15 years.

TCM #8 may have a short term negative impact on air quality due to emissions generated during construction. Congestion on freeways and adjacent arterials can be expected during construction. However, Caltrans plans to implement traffic mitigation programs in conjunction with certain major projects, including the 680/24 project and the I-80 project.

TCM #9 - IMPROVE BICYCLE ACCESS AND FACILITIES

Purpose

TCM #9 will reduce motor vehicle travel and mobile source emissions by promoting the expansion of bicycle facilities such as bike routes and lanes, and by increasing bicycle access to buses, trains, and bridges.

Background

Bicycles are a pollution-free transportation mode, well suited to short and medium range trips. They also provide an excellent means of access to transit stations. Despite these attributes, however, bicycles are poorly served by the existing transportation infrastructure. According to 1980 Census data for the Bay Area, bicycles are the primary transportation mode for only 1.3% of commute trips in the region.

Experience in cities such as Palo Alto and Davis, as well as in European cities such as Amsterdam, shows that bicycles can play an important role in local transportation. The improvements in access and facilities in TCM #9 should enable bicycles to play a greater role in the overall regional transportation system.

Description

Bicycle improvements in TCM #9 include:

- Expand the system of local and regional bike routes, lanes and paths to serve shopping areas, employment centers, educational and cultural facilities, civic centers, etc.
- Provide adequate curb lane widths for bicycles on roadways
- Permit bicycles on freeway shoulders where no alternative parallel route exists
- Adjust signal equipment and provide pavement marking for detecting bikes
- Expand carrying capability for bikes on buses, ferries and rail systems
- Provide means for bicycles to cross all existing Bay bridges; encourage Caltrans to provide direct access for bicycles on the Benicia-Martinez and Richmond-San Rafael bridges; provide direct access for bicycles on any new or modified bridge construction.
- Incorporate bicycle access and facilities into the site design for new developments (see TCM 16).
- Cities and counties can include provision of bicycle amenities in the development approval process.

TCM #9 sets a goal of achieving a 3% bicycle commute mode share by 1997, compared to 1.3% in 1980. (MTC's 1990 Household Travel Survey is expected to provide more recent data when it is issued in summer 1992.)

Travel Market Affected

TCM #9 will help to promote the use of bicycles (or bicycles combined with transit) for the entire range of intra-regional trips, including commuting, shopping, personal business, and social and recreational travel. Bicycles are especially well suited for short distance trips, including shopping, errands, social visits.

Effectiveness

TCM #9 is expected to yield the following emission reductions:

	RHC	NOx	CO
Phase 1	0.01%	0.01%	0.01%
Phase 2	0.02%	0.02%	0.03%
Total	0.03%	0.03%	0.04%

Cost

Transportation Development Act (TDA) funds of about $3 million per year are currently available for bicycle improvements. If legislation is approved to provide funding for the mobility package, approximately $5 million per year might be available to fund additional bicycle improvements.

Implementation

Implementation of TCM #9 will require cooperation among BAAQMD, MTC, Caltrans, transit operators, cities and counties, and employers, developers, and property managers.

Approximately $3 million per year in TDA funds is currently available for region-wide bicycle improvements. MTC will require cities and counties to form Bicycle Advisory Committees and develop comprehensive bicycle plans as a condition for receiving TDA funds. MTC is preparing guidelines regarding the composition of Bicycle Advisory Committees. The new TDA Article 3 requirements will become effective for the FY 1993/94 funding cycle.

MTC will encourage transit operators to increase bicycle carrying capability.

MTC will encourage Caltrans to provide means for bicycles to cross all Bay bridges.

The Air District will include provision of bicycle facilities at developments such as office parks, shopping centers, and residential complexes as a component of indirect source control (TCM 16).

MTC will propose new legislation to fund the mobility package, including money for the Bay Trail project, bike lane improvements, for Benicia/Carquinez, Richmond and Bay bridges, and bikes on transit.

Impediments

Full implementation of Phase 2 bicycle improvements is contingent upon approval of legislation to provide revenues to fund the mobility package (see TCM 21).

Other Impacts

In addition to improving air quality, TCM #9 will mitigate traffic congestion. Benefits in travel time savings are estimated at $1.4 million per year. Other impacts include reduced fuel consumption, motor vehicle depreciation and wear and tear, road maintenance costs, and less need for parking at new developments.

Bicycles are also an excellent means of exercise. However, bicycles have a high rate of accident and injury compared to other modes of transportation. This is due, at least in part, to the design of the road system. More and better bike routes are one element of TCM 9. In addition, public education is needed among both bicyclists and motorists to promote safer bicycling.

TCM #10 - YOUTH TRANSPORTATION

Purpose

TCM #10 is designed to reduce motor vehicle travel and mobile source emissions related to the transportation of youths and students.

Background

Youth and students have special transportation needs. Because they have limited access to motor vehicles, they depend upon public transit, bicycles, walking, and parental chauffeur services.

Due to funding constraints, a number of school districts in the Bay Area are no longer able to operate school bus services.

In addition to addressing the immediate transportation needs of youths, we must look to the future. Since today's youths will be the commuters of tomorrow, it is important to educate them about the need to reduce motor vehicle travel to combat traffic congestion and air pollution.

Description

TCM #10 will improve youth/student mobility and reduce vehicle trips by:

- funding discount transit tickets for youths, and making tickets available through schools
- seeking new funding through educational or other funding sources for school districts which may be interested in reinstating school bus service (these services are usually contracted out to private carriers)
- encouraging carpooling among high school students with cars

TCM #10 will also reduce emissions by encouraging the conversion of school buses to clean fuel vehicles.

Travel Market Affected

According to MTC travel data, school trips account for 2-3% of total vehicle miles traveled in the Bay Area. TCM #10 would address this market, as well as youth travel outside of school hours.

In addition to its direct impact on school trips, TCM #9 may also have an impact on commute trips. If additional school bus service is provided, parents who must now drop off their children at school while in route to work might be able to commute via ridesharing or transit.

Effectiveness

All emissions reductions from TCM #10 are expected to come in Phase 2.

RHC	NOx	CO
0.14%	0.14%	0.16%

Cost

If legislation is approved to provide funding for Phase 2 mobility improvements, approximately $11 million could be allocated for youth transportation as follows: $5 million for discount transit tickets, $5 million for school bus service, and $1 million to promote ridesharing among students.

Implementation

Full implementation is contingent upon approval of funding for Phase 2 mobility improvements (see TCM 21). If funds are provided, MTC will work with the school districts and transit operators to establish a process for the allocation of funds.

MTC will allocate funds to school districts for provision of bus service and for purchase of clean fuel buses where potential emission reduction benefits are high. AB 434 funds may be available for purchase of clean fuel school buses.

MTC will allocate funds to transit operators for provision of youth discount tickets.

BAAQMD and MTC will work with RIDES and/or school districts to promote carpooling for high school students with cars.

Impediments

Implementation of this measure depends upon approval of State legislation to provide funding for mobility improvements (see TCM 21).

Other Impacts

In addition to reducing emissions, TCM #10 will mitigate traffic congestion. Travel time savings of approximately $5.2 million per year are expected from reduced congestion due to Phase 2 measures. Other benefits include reduced fuel consumption and wear and tear on motor vehicles and roadways, as well as less demand on parents to provide private transportation for their children.

This measure may also yield long-term benefits to the extent that it succeeds in instilling in today's youth an awareness of the need to reduce motor vehicle travel.

TCM #11 - INSTALL FREEWAY TRAFFIC OPERATIONS SYSTEM (TOS)

Purpose

TCM #11 will reduce congestion-related emissions by improving the flow of traffic on regional freeways.

Background

Traffic congestion is a significant cause of motor vehicle emissions. Much of the regional freeway network already operates at or above capacity during peak periods, and congestion is expected to increase substantially in future years, even with planned increases in capacity. Operational improvements are a very cost-effective means to improve the efficiency of the regional freeway system.

Description

Caltrans' Traffic Operations System (TOS) includes multiple traffic management components: ramp metering, traffic surveillance, traffic advisory signs, and incident management to eliminate traffic tie-ups more quickly.

Federal TCM 26 assumed completion of Caltrans' TOS on freeways in the immediate vicinity of the Bay Bridge (Segment 1). Full implementation of the TOS will cover a far greater portion of the Bay Area's freeways--about 216 miles.

Delays on bridge approaches can be reduced through automated electronic toll collection facilities.

Travel Market Affected

TCM #11 will address all categories of vehicle trips, including inter-regional and commercial travel, as well as commute trips, shopping recreation, personal business, etc.

Effectiveness

TCM #11 is expected to yield significant reductions in both emissions and vehicle hours of delay. However, by reducing congestion, this measure is expected to produce a small increase in vehicle trips and VMT.

	RHC	NOx	CO
Phase 1	0.42%	0.35%	0.65%
Phase 2	1.40%	1.10%	1.80%
Total	1.82%	1.45%	2.45%

Cost

Caltrans has funding to complete the Segment 1 portion of the TOS in Phase 1 of TCM #11. Funding requirements for Phase 2 improvements include $25 million for full implementation of the TOS system and $10 million for a traffic advisory system.

Implementation

Caltrans is responsible for installing and operating the Traffic Operations System. Funds are programmed in the TIP for this project.

Segment 1 of Caltrans' TOS is expected to be completed by autumn 1991. Full implementation of the TOS to cover 216 miles of freeway is expected to be completed in Phase 2.

MTC will develop a Metropolitan Transportation System Operations Plan, in cooperation with Caltrans, which will better define the ramp metering component of the TOS.

MTC will seek funding to install electronic toll collection equipment on the Bay Bridge.

Impediments

Proposition 111 should provide a source of funds for TOS projects via the Flexible Congestion Relief funding category. However, full implementation of the Phase 2 elements of TCM #11 requires approval of State legislation to provide additional funding for mobility improvements (see TCM 21).

Other Impacts

In addition to providing significant emission reductions, TCM #11 should substantially reduce traffic congestion and vehicle hours of delay. Travel time savings are expected to total $86 million per year. Reduced traffic congestion will mean an improvement in quality of life for Bay Area residents.

It should be noted that although most TCMs cause reduced vehicle trips and vehicle miles traveled, TCM #11 is expected to result in a slight increase in trips and VMT by reducing delays. The combined projected impact for Phases 1 and 2 is 0.10% increase in trips and 0.15% increase in VMT. By increasing VMT, TCM #11 will cause a small increase in emissions of PM10.

Installation of freeway ramp meters has the potential to create traffic congestion on local streets adjacent to the ramps. Mitigation measures can be implemented to reduce this impact, including arterial traffic management, as described in TCM 12.

TCM #12 - IMPROVE ARTERIAL TRAFFIC MANAGEMENT

Purpose

By improving the flow of traffic on arterial routes, TCM #12 will reduce running emissions, congestion-related emissions, and vehicle idling.

Background

Arterial routes play a critical role in the regional transportation system. They are used on a very high percentage of vehicle trips, both for short distance trips (shopping, errands, recreation), as well as to provide access to freeways for longer trips. Arterial travel produces relatively high emissions per mile, due to low average speed and frequent stops and starts.

MTC projects that travel on arterial routes will increase substantially over the next twenty years. Because no significant expansion in arterial capacity is planned, this is likely to result in a dramatic increase in congestion. According to MTC data, vehicle hours of delay on arterials will double in the 1990-2010 period. Measures to improve arterial traffic flow are essential to maintain regional mobility and to avoid an increase in vehicle emissions due to congestion. On congested routes, a relatively small reduction in vehicle traffic yields substantial reduction in traffic congestion.

Arterials also serve key bus routes throughout the region. Improving the flow of buses on arterials can reduce bus travel times and stimulate increased transit patronage.

Description

Signal timing. Establish new signal timing programs (Federal TCM 24) and maintain those programs already in existence (Federal TCM 25).

Bus Improvements. Improve arterials for bus operation through signal preemption, relocation of bus stops, or other means.

Arterials as Reliever Routes. MTC has conducted several studies which analyze how arterials can serve as reliever routes (or "SMART streets") for heavily congested freeways. This concept must be coordinated with TCM #11, the Traffic Operation System.

Travel Market Affected

TCM #12 will affect the entire range of vehicle trips, including commute travel, school travel, shopping, personal business recreation, and commercial travel.

Effectiveness

TCM #12 will yield the following reductions in vehicle emissions:

	RHC	NOx	CO
Phase 1	0.20%	0.25%	0.30%
Phase 2	0.23%	0.27%	0.33%
Total	0.43%	0.52%	0.63%

Note that, by reducing congestion, TCM # 12 will (like TCM 11) produce a small increase in vehicle trips and VMT.

Cost

The cost to implement TCM #12 is estimated at $6 million per year: $2 million to maintain the existing signal timing program; $2 million to expand the program to additional cities; and $2 million for traffic signal preemption for transit.

Implementation

TCM #12 will span Phases 1 and 2. Implementation of TCM #12 will require cooperation among MTC, Caltrans, cities and counties, Congestion Management Agencies, and transit operators.

Signal timing. Since 1983, approximately 34 Bay Area local agencies have participated in Caltrans' Fuel Efficient Traffic Signal Management (FETSIM) program, which has resulted in the re-timing of more than 1,700 traffic signals. There are up to 3600 signals that could be timed to optimize traffic flow. MTC will conduct a regional traffic management study to identify priorities for signal timing (timing of study depends upon funding). In Phase 2, MTC will use newly authorized funds to expand the FETSIM program so that all eligible signal systems are updated at least every five years.

Successful signal timing efforts require coordination across local boundaries. MTC is currently coordinating a multi-jurisdictional signal re-timing project along El Camino Real in five cities in San Mateo.

CMPs should include arterial traffic management strategies as a key requirement in their transportation demand management elements. Coordination between neighboring jurisdictions on signal timing should be a requirement for receiving subvention funds. MTC will review CMPs to ensure coordination between neighboring cities in the development of arterial traffic management plans and signal timing projects.

Bus improvements. Local agencies and transit operators will examine ways to improve the flow of buses through signal preemption, relocation of bus stops and other means. These efforts are related to the CMP requirement for developing and maintaining level-of-service standards for transit. Bus flow improvements are a Phase 2 measure.

Smart streets. This program will be implemented by Caltrans in coordination with MTC. SMART streets are a Phase 2 measure.

Impediments

Full implementation of TCM #12, including expansion of signal timing programs to additional cities, will require State legislation to provide additional funding for mobility improvement measures (see TCM 21).

Other Impacts

By reducing congestion, TCM# 12 is expected to produce travel time savings of at least $21 million per year. TCM #12 will also help to reduce fuel consumption and noise by improving the flow of traffic and reducing vehicle idling, braking and acceleration. By improving the flow of bus traffic, TCM #12 may help to stimulate increased transit ridership.

It should be noted that TCM #12 is expected to result in a small increase in vehicle travel; vehicle trips are projected to increase by 0.03% and vehicle miles traveled by 0.02%. TCMs 11 and 12 are the only TCMs that increase motor vehicle travel.

Implementation of the SMART street concept in Phase 2 to divert overloaded freeway traffic on to major arterials could result in increased vehicle trips, emissions, noise, in certain corridors. However, implementation of the other elements of TCM #12 to improve the flow of traffic on arterials should help to mitigate these potential local impacts.

TCM #13 - TRANSIT USE INCENTIVES

Purpose

TCM #13 will help to increase transit use and reduce motor vehicle travel by reducing selected fares, expanding the marketing of transit tickets and passes, and improving coordination of service among transit systems.

Background

To shift auto trips to transit, transit must be competitive with the private automobile in terms of cost, travel time and convenience. There are currently 17 major transit operators in the nine county Bay Area. While this structure provides good local service in many areas, it complicates the use of transit for travel around the region.

Although transit already plays a key role in peak period commute travel, it is under-utilized for non-commute trips such as shopping and recreation. Special reduced fares will be targeted toward increasing transit ridership for non-commute purposes during off-peak periods and weekends when there is considerable excess capacity.

In addition to stimulating transit use, reductions in transit fares will help to address "equity" concerns related to revenue-generating and pricing measures (TCMs 21 and 22).

Description

- Proposals for fare reduction include:
  - free feeder bus transfers between local bus systems and BART, Caltrain, and ferries. (Federal TCM 21, regional transit coordination, included a free bus-BART transfer, but the required legislation was not approved)
  - fares significantly reduced or eliminated in the off-peak
  - exploration of special transit fares targeted at smaller groups of riders, such as group/family discount fares for weekend travel, a "tourist" fare for visitors to the Bay Area, or a downtown fare for transit use within a defined area.
- Measures to expand distribution of transit tickets and passes include:
  - expand the Regional Transit Connection (RTC) ticket distribution program which provides for on-site sale of transit tickets at participating employers (Federal TCM 22)
  - introduce a "Commuter Check" program for employers who wish to directly subsidize purchase of employee transit tickets (Federal TCM 22)
  - set up local transportation stores, for drop in purchases of tickets and other kinds of transportation assistance (modeled on the Berkeley TRIP program).

- Improve coordination of schedules, fares and transfers among transit operators (Federal TCM 21).

- A regional toll-free transit information number could be established. Funding for implementation of this measure is contingent upon approval of SB 210 (Kopp) to raise tolls to $2 on the San Mateo, Dumbarton and Bay bridges.

Travel Market Affected

TCM # 13 will make transit a more attractive option for a wide range of trips. Measures to promote the sale and subsidy of transit passes through employers (the RTC and "Commuter Check" programs) focus on commute travel. Measures to reduce off-peak fares focus on increasing use of transit for non-work travel (shopping, recreation, etc.).

Effectiveness

TCM #13 is expected to provide the following emission reductions:

	RHC	NOx	CO
Phase 1	0.11%	0.11%	0.09%
Phase 2	0.21%	0.21%	0.22%
Total	0.32%	0.32%	0.31%

Cost

Implementation of TCM #13 is estimated to cost approximately $18 million per year: $10 million to reduce fares for target groups; $5 million to subsidize feeder bus service for rail and ferries; and $3 million for "transit stores" based on the Berkeley TRiP model.

This figure does not include the cost to improve schedule and fare coordination among transit operators, since these activities are mandated by SB 602. Potential expenditure by employers who choose to participate in the "Commuter Check" program has not been estimated. However, such expenditures constitute a "transfer payment" from employer to employee, rather than a true "cost." Also, since employers receive state and federal tax benefits for providing transit subsidies to their employees, the actual cost to employers will be considerably less than the value of vouchers provided to their employees.

Implementation

TCM #13 spans both Phase 1 and Phase 2. Phase 1 elements include integration of transit service (Federal TCM 21 in response to AB 602), expansion of the RTC program, and implementation of the "Commuter Check" program.

Implementation of fare and schedule coordination (AB602) is already well underway, based on guidelines in MTC Resolution 2137. MTC is working with the region's transit operators via the Regional Coordination Task Force. At least a dozen new joint passes and transfer arrangements have already been developed in the region, such as the "BART Plus" pass. The ultimate goal is a universal ticket for use on all transit systems in the region.

MTC manages the Regional Transit Connection (RTC) program to distribute transit tickets at employment sites. Transit operators underwrite the program. The program expanded from 141 participating companies in January 1990 to 163 in June 1991, with nearly $10 million in tickets and passes sold in FY 1990-91. To help expand the RTC program, RIDES for Bay Area Commuters will promote the RTC program as part of its employer services, beginning in FY 1991-92.

MTC introduced the new "Commuter Check" program in September 1991. This program is supported by $80,000 in State Transportation Assistance funding. The program provides an easy means for employers to subsidize transit passes for their employees. MTC, RIDES and transit operators are promoting the service to employers and commuters. Commuter Check, Inc. administers the program.

Phase 2 measures in TCM # 13 include subsidies for feeder bus service, fare reductions for target groups, and "commute stores." Full implementation of Phase 2 elements requires approval of legislation to provide additional revenues (see TCM 21).

Impediments

The principle obstacle to full implementation of TCM #13 is the need to obtain additional funding sources for the Phase 2 measures.

Other Impacts

In addition to reducing emissions, TCM #13 will help to reduce traffic congestion and fuel consumption. Benefits due to travel time savings are estimated at about $12 million per year. This measure should also increase transit patronage, provide more convenient service for transit users, and promote increased mobility for riders who are sensitive to fare levels. TCM # 13 will be of particular benefit to the transit dependent population in the region.

By reducing motor vehicle use, TCM #13 will result in reduced vehicle wear and tear and depreciation, reduced costs for roadway maintenance, and reduced need for parking at employers and other sites in the region.

TCM #14 - VANPOOL LIABILITY INSURANCE

Purpose

This measure is designed to reduce motor vehicle trips and VMT by reducing the cost of vanpool liability insurance in order to promote formation of new vanpools and maintenance of existing vanpools.

Background

Vanpools provide an efficient, cost-effective and flexible means of commuter transportation. Vanpools offer several advantages over conventional transit service. They can easily adjust route and schedule to respond to changing commute patterns, and they can serve commute routes that lack sufficient demand to support full-scale transit service. Unlike bus and rail service, vanpools are generally self-supporting; they require little or no public subsidy.

There are currently an estimated 800 vanpools operating in the Bay Area. Together, these vanpools remove an estimated 10,000 cars from the region's highways during commute periods. Vanpools play an important role as a commute alternative in certain areas that are poorly served by commuter transit, such as Solano County. The 300 vanpools that serve downtown San Francisco play an important role in relieving congestion on major approaches to San Francisco, particularly the Bay Bridge, and reducing the demand for parking in downtown San Francisco.

Vanpools also serve the expanding ranks of long-distance commuters who travel to Bay Area jobs from homes in the Sacramento area or in the San Joaquin Valley. Additionally, as employment continues to increase in suburban and rural areas where transit service is limited (such as Pleasanton and San Ramon), vanpools provide a high occupancy commute alternative.

Although they occupy an important niche in the regional commuter transportation system, vanpools currently serve less than one percent of Bay Area commuters--just a fraction of their potential market. While the number of vanpools in the region grew rapidly in the early 1980's, the rate of growth has slowed markedly over the past several years.

Liability insurance is a significant cost to vanpool operators--in the range of $2500-$3000 per year. This expense is a major issue for employers which are interested in establishing or sponsoring vanpool programs for their workers.

Description

A publicly financed liability insurance program could lower vanpool operating costs and provide economic incentives to organize vanpools.

Phase 1 of TCM #14 will determine how a publicly financed or subsidized vanpool insurance program can stimulate the growth of vanpooling in the Bay Area. Such a program would be established in Phase 2, pending the results of the Phase 1 study and availability of funding.

Travel Market Affected

This measure is targeted at commute travel, particularly long-range commutes in excess of 40 miles roundtrip, which is the market best suited for vanpooling.

Effectiveness

The following emission reductions are expected for TCM# 14:

RHC	NOx	CO
0.02%	0.02%	0.01%

Since motor vehicles produce emissions at a high rate after a cold start, the actual level of emission reduction achieved will depend on how vanpool riders meet their vans. If most vanpool passengers drive to meet their vanpool, the potential air quality benefit from this measure would be reduced.

Cost

Estimated cost of a publicly financed vanpool liability insurance program for the Bay Area is at $2.1 million per year. Actual cost would depend upon the level of subsidy provided and the scope of the program.

Implementation

RIDES will conduct a study of vanpooling in FY 1991-92. The study will assess the vanpool market and examine the need for a publicly funded or subsidized vanpool insurance program. Implementation of such a program will occur in Phase 2, subject to availability of funding.

Impediments

Implementation requires approval of legislation to provide additional revenues to fund this measure (see TCM 21).

Other Impacts

In addition to reducing motor vehicle emissions, TCM #14 will mitigate traffic congestion and reduce fuel consumption. Vanpools are especially important for reducing congestion on heavily traveled commute corridors such as I-80, Hwy 101 in the North Bay, and I-680 in the East Bay. Benefits in the form of travel time savings are estimated at approximately $1 million per year. Vanpools also help to reduce the amount of parking needed at worksites.

Because most vanpools serve long distance commutes, ranging from 50 to 200 miles roundtrip per day, they provide tremendous benefits to their passengers in terms of reducing commute costs and reducing the stress associated with long distance commuting.

TCM #15 - PROVIDE CARPOOL INCENTIVES

Purpose

TCM #15 is intended to reduce motor vehicle trips and VMT by providing user incentives for carpools and vanpools.

Background

The major cause of the Bay Area's traffic congestion and vehicle emissions problems is not a lack of capacity in the transportation system, but inefficient use of that system. The single occupant vehicle is the crux of the problem, especially during commute periods, when approximately 90% of vehicles carry only the driver.

Ridesharing represents a very cost-effective means to increase vehicle occupancy, thus reducing vehicle trips, VMT, congestion, and vehicle emissions. Increased ridesharing is also essential to help the Bay Area achieve a regional 1.5 average vehicle ridership (AVR) during peak commute periods by 1999, as required by the California Clean Air Act.

Cost, time and convenience are the prime factors that determine individual choice of travel mode. HOV lanes (TCM 8) and preferential parking for carpools help to offset the advantage that solo driving generally offers in terms of time and convenience. Ridesharing user incentives are designed to increase the cost advantage of ridesharing compared to solo driving.

Description

TCM #15 includes several elements to provide improved user incentives for ridesharing.

- Provide financial incentives for three (3) or more person carpools in the form of gasoline vouchers or other financial payments.
- Employers will be encouraged to satisfy their responsibilities under the employer-based trip reduction rule (TCM 2) by providing subsidies and incentives for both ridesharing and transit.
- MTC and the Air District will support federal legislation to increase tax deductions for employer-provided carpool and transit subsidies.

Travel Market Affected

TCM #15 focuses on commute travel.

Effectiveness

Emission reduction through TCM #15 are expected to be achieved primarily during Phase 2. Estimated reductions are:

RHC	NOx	CO
0.20%	0.30%	0.20%

Cost

Employers which provide cash incentives for employees who rideshare would experience additional expenses, depending upon the level of subsidy and the scope of the program. However, these expenses are "transfer payments" to employees rather than net costs. Such expenses would be reduced or eliminated if combined with parking charges for solo commuters. Costs of providing incentives to carpools via MTC and/or RIDES would depend upon the type of program that may be developed.

Implementation

MTC and RIDES would design an incentive program administered by RIDES to increase the number of 3 or more person carpools in the region. The program could require registration with the employer and RIDES and a certain qualifying period before participating carpools would become eligible for incentives. This program could be funded from the "mobility package," which requires approval of legislation described in TCM 21.

MTC and the Air District will support legislation to encourage employers to increase subsidies for employees who commute via ridesharing and transit. The federal tax deduction for transit subsidies has recently been increased from $15 to $21 per month. However, this level is still much too low. Also, state and federal tax policies that allow employers to deduct the costs of providing free or subsidized parking to employees should be changed.

Impediments

The primary obstacle to implementation of TCM #15 is the need to secure approval of legislation to fund the Phase 2 mobility package and the need to secure approval of federal legislation to increase tax deductions for ridesharing and transit subsidies.

Other Impacts

In addition to reducing emissions, TCM #15 will reduce traffic congestion and fuel consumption. Benefits from travel time savings are expected to total approximately $15 million per year. This measure will also reduce wear and tear and depreciation on motor vehicles, and reduce maintenance costs for the region's roadway system.

TCM #15 will help to ensure maximal usage of the HOV lane network that is described in TCM 8.

TCM #16 - INDIRECT SOURCE CONTROL PROGRAM

Purpose

The purpose of the Indirect Source Control (ISC) Program is to:

- encourage developments--as well as local and regional plans--which minimize dependence on motor vehicles and, thereby, reduce air contaminant emissions [1];
- require mitigation of adverse air quality impacts of facilities which do attract a significant volume of motor vehicle traffic.

TCM #16 will improve air quality by reducing motor vehicle travel to and from major residential developments, shopping centers, recreational and entertainment centers, universities, airports, parking garages, highways, and other generators of significant amounts of motor vehicle traffic. The indirect source control program will regulate new and existing developments in order to minimize adverse air quality impacts.

The District intends to establish a system which allows cities and counties to choose among alternative measures to achieve clean air objectives.

Background

Indirect sources are facilities and land uses that attract or generate motor vehicle travel and the air contaminant emissions associated therewith. The California Clean Air Act requires air quality management districts to develop ISC programs as part of the 1991 Clean Air Plan.

A district may delegate its powers, under specified circumstances, to local government; the BAAQMD will exercise this provision wherever local government will assume and adequately fulfill the responsibilities entailed. If the local government elects not to implement the program, BAAQMD will do so through a District permit process. The District may also exercise control where local government does not have the authority to do so, e.g. relating to State and federal facilities, highways, schools, universities.

Description

In regard to new developments of specified type and size, BAAQMD will develop an Indirect Source Control program for the Bay Area to encourage project location and design which minimize auto dependence and/or to require mitigation of adverse air quality impacts. A separate rule will be developed to apply to major existing generators of motor vehicles.[2]

In terms of capacity-increasing roads and highways, the BAAQMD will review the methodology and analysis used by MTC in the federal conformity process to identify how to apply or augment it to address State Standards and CCAA transportation requirements.

Travel Market Affected

While the commute to work is addressed in TCM #2, the measures in TCM #16 will address a wide range of non-commute travel, including shopping, personal business, recreation and education.[3]

Effectiveness

Applying ISC to new development will reduce emissions by approximately 0.7% by 1997. This estimate does not include the benefits to be derived by TCM #18, High Density Development Near Transit Stations, or from an additional ISC rule focusing on *existing* major attractors of motor vehicles.

In a longer time-horizon, moreover, it has been estimated that an ISC program could reduce vehicular miles travelled (VMT) by as much as **10.00% by the year 2005 or 2010;** ROG, NOx and CO emissions would be similarly reduced (according to consultants to MTC and the District). It is in the nature of ISC that the program will yield increasing benefits over time. Because land use patterns and site design exert a strong influence on travel patterns and transportation mode choice, ISC will have a cumulative positive effect as the region develops further and/or as more new and existing uses are brought into the program.

Costs

A regionwide ISC program is estimated to cost $12 million per year. Costs to local governments and/or to the District, for permit processing and monitoring, could be covered by permit fees paid by project sponsors or property owners.

Benefits

Savings in travel time are estimated to be worth $50 million per year. There would thus be a net benefit -- calculated at $132,000 per ton of ROG reduced.

Implementation

Under the provisions of the California Clean Air Act (CCAA), the Air District is responsible for indirect source control. Further details of the program will be determined during the Air District's rule-making process, which will entail workshops, consultation with affected parties, and public hearings.

The CCAA allows - and the Air District prefers - to delegate implementation of indirect source control to cities and counties which meet Air District objectives. Where delegation is approved, a developer would be subject to air quality requirements added to the existing building or use permit system of the local government; no special permit from the Air District would be required. In the case of capacity-increasing roads and highways, the BAAQMD will consider delegation to MTC if agreeable methodology and criteria are developed.

The District will develop performance standards and mechanisms to assist cities and counties in meeting the requirements. The information required of developers would be similar to that already required in CEQA environmental impact reports. One precondition for delegation would be the existence of - or at least commitment to produce - an air quality element or section, approved by the Air District, as part of the general plan of the county or city. A related proposal would have the city or county exempted from all ISC requirements, other than adoption of an air quality element or section, if its plan includes a commitment to reduce emissions from all sources by 5% per year - through methods of demonstrated effectiveness.

Where local jurisdictions do not wish to assume delegation - or do not adequately fulfill the responsibilities entailed - the District will implement an ISC program directly through its own air quality permit program. This would be similar to the concurrent permit program which now takes place for direct sources, e.g: industrial facilities which directly emit air contaminants require separate permits from the local government **and** from the Air District. Under the CCAA, the District would also have to reserve the right to rescind delegation -- and undertake its own direct permit program -- in cities and counties which fail to fulfill their commitments.

Separate requirements and processes will apply to new and existing developments. The schedule for developing and adopting an indirect source control program is as follows:

	New Development	Existing Development
Begin rule development	1991	1991
Hold concept workshops	1992	1992-93
Draft regulation	1992	1993
Hold workshops on regs.	1992-93	1993-94
Adopt rule	1993	1994
Delegation agreements	1993-94	1994-95
Implementation	1994	1995

Other Impacts

TCM #16 would reduce traffic congestion and produce a number of related societal benefits.[4] There would also be burdens placed on developers and/or property owners, as well as on local governments and the District [5]. Conflicts between the ISC program and local land use plans and decision making may arise, particularly in those local jurisdictions that do not assume the responsibility for the ISC program.

Notes:

1 Air districts do not have authority over local land-use decisions. However, air districts, as well as local governments, may provide incentives which foster regional development patterns that are beneficial to air quality. Among the features of such beneficial patterns might be:

- mixed land uses, i.e. residences, workplaces and services located close enough together to obviate, or at least minimize, the need for private motorized transportation between them. (Walking or bicycling are the ideal forms of pollution-free transportation);

- pedestrian-oriented design, such as sidewalks, adequate crosswalks on major streets, building entries near sidewalks rather than behind parking lots, and convenient transit stops.

- housing affordable to the workers in nearby workplaces;

- development confined within stable urban growth limits, with an emphasis on infill projects and a minimum of auto-dependent sprawl;

- public transportation, reasonably priced with superior service and wide area coverage;

- residential and workplace densities high enough to support a viable, cost-effective public transportation system (but not so dense or poorly planned as to cause traffic congestion which results in carbon monoxide or other contaminant hotspots);

- population and workforce diversity throughout the urbanized areas, in order to fill a variety of employment and service positions without necessitating long commutes.

2 Project sponsors and/or owners/managers, as well as cities and counties, would have options such as support of transit, bicycle and pedestrian access facilities; parking management (pricing and/or supply limits); and trip reduction programs; non-mobile-source mitigations may also be credited, e.g: reduction of space-heating and other area-source or point-source emissions not otherwise regulated.

Where ISC authority is to be delegated, the local government could choose to impose performance standards, specific mitigation programs and/or impact fees according to a plan -- e.g: air quality element of the general plan -- and fee-collection and revenue-allocation programs approved by the District. The District would attempt to establish a system which would allow maximum flexibility to cities and counties to meet emission reduction requirements, with the objective of meeting air quality standards.

Impact fees would not be collected by the District. However the type and level of expenditures, by project sponsors for mitigations, would require approval of the implementing agencies. The level of sponsor expenditures or the mitigation program required would be based on the level of adverse air quality impacts. Project sponsors would need to demonstrate and quantify reductions in motor vehicle attraction and resultant HC, NOx, and/or CO emissions -- below those of "normal projects" of similar type and size (default value) -- due to project location, density, design, mitigations, etc.

3 The largest category of emissions subject to control would be those of on-road light-duty motor vehicles attracted to development sites. (Specific sub-sets of these emissions will depend upon the specifics of the ISC rule adopted.) The level of controllable emissions would be a function of quantity and locations of yearly construction in the Bay Area (and number, type and location of existing relevant projects); facility/land-use type and project size; trip-generation rates and average trip-lengths; and motor-vehicle pollutant emission rates.

4 In addition to reduction of criteria air contaminants, an ISC program would, in most instances, also:

- minimize generation of pollutants which are implicated in more recently recognized environmental problems such as toxic contamination, global warming, acid deposition, and stratospheric ozone depletion;
- conserve energy, fuel, and vehicle depreciation and maintenance
- reduce traffic congestion and its resultant lost time, mental stress, diminished morale, and other problems associated with long commutes;
- reduce wear and tear on roads and the need for expansion of highway and road construction;
- utilize urban infrastructure more efficiently;
- utilize land resources more efficiently;
- preserve regional open space, agriculture, the Bay, wetlands, parks and recreational areas, and other amenities by encouraging land use decisions that minimize sprawl;
- facilitate management of water quality and supply;
- improve mobility for all segments of the population;
- possibly counteract existing trends toward the further separation of population sectors -- if regional planning is adequately sensitive to the benefits of maintaining demographic diversity.

5 A new permit system would place some burden on developers and their agents. In the case of ISC applied to major existing traffic generators, relevant property owners and/or managers would have to assume new responsibilities. These burdens would be substantially reduced where local governments apply for and receive ISC delegation from the District; in that situation project sponsors/owners would need only to fulfill a limited number of new standards and responsibilities within existing permits. Costs of mitigation programs -- e.g. to subsidize transit operations -- or in-lieu impact fees should local governments choose to impose them, would also be carried by developers or property owners.

Coordination between the District and municipal and county governments would need strengthening. New legislation may be needed to facilitate effective linkages and coordination of congestion management programs with the ISC program. Compliance monitoring will be required - whether or not delegation takes place.

TCM #17 - CONDUCT PUBLIC EDUCATION

Purpose

The purpose of this measure is twofold: 1) to educate the public about the current status of air quality in the Bay Area and the causes of air pollution, and 2) to inform people about individual actions that contribute to better air quality.

Background

Implementation of the 1991 Clean Air Plan will require the support of all elements of the Bay Area community. The success of the plan will depend to a significant extent on the voluntary cooperation of individuals.

The Air District and MTC conducted a public opinion survey in 1990 to learn more about public attitudes toward air quality issues. The poll showed that the public is strongly committed to clean air for the Bay Area. However, it indicated that many people do not clearly understand the causes of air pollution, nor the ways in which they can personally contribute to the achievement of clean air.

Description

With the support of the Public Outreach Steering Committee, the Air District has developed a public education campaign that began in September 1991 with the theme of "Clear Choices for Clean Air." This campaign will lay the groundwork for an ongoing campaign throughout the life of the CAP.

The campaign describes health effects of air pollution and focuses on actions that the individual citizen can take to help improve air quality, such as using transit, driving a well-maintained vehicle, and combining trips to reduce cold starts. This aspect of the public relations campaign is related to TCM 23 (Voluntary "No Drive" Days).

Future topics that may be addressed in the public education effort include:

- the air pollution effects of older cars and cars that are out of tune
- air quality benefits of using cleaner fuels
- the benefits of shopping by phone
- benefits to the individual and the employer from working at home (telecommuting)
- the benefit of leaving the car at home one day per week
- the benefit of using feeder buses, bicycling or walking to transit stations
- information about obtaining discount transit tickets
- educational programs designed for use in school curricula.

Travel Market Affected

The public education campaign addresses all types of trips: shopping, recreation, personal business, school and commuting. The campaign stresses the need to reduce motor vehicle use for all types of trips.

Effectiveness

No emission reduction has been directly attributed to the public education campaign. However, the campaign will contribute to reduced emissions by enhancing public support for and use of transit, ridesharing, bicycles and other transportation alternatives.

Cost

The public education campaign has an initial cost of approximately $250,000, funded by a grant from the Environmental Protection Agency. The BAAQMD is pursuing additional funds for the continuation and expansion of the program.

Implementation

The Air District has primary responsibility for implementation of the public education campaign. The District has formed a Public Outreach Steering Committee, composed of representatives from the business community, labor, local government, civic groups and the environmental community to help develop and implement the campaign. The District has also formed resource teams in every Bay Area county and an employer resource team to help implement the campaign.

The Air District will cooperate with other institutions that are working on air quality and transportation issues, including MTC, ridesharing agencies, major employers, and local governments. The Air District's campaign is designed to complement independent efforts such as "Beat the Back Up," campaigns to promote ridesharing and transit, and employer trip reduction programs.

Impediments

The public education campaign is supported by a short-term grant from EPA. Additional funding must be secured to finance an expanded public education campaign.

Other Impacts

The public education campaign will increase public awareness about air quality issues, especially the ways in which motor vehicles cause air pollution. By promoting individual actions to reduce motor vehicle travel and vehicular emissions, the campaign should help to reduce traffic congestion and fuel consumption, and contribute to an overall improvement in quality of life for residents of the Bay Area.

TCM #18 - ZONING FOR HIGH DENSITIES NEAR TRANSIT STATIONS

Purpose

TCM #18 is designed to reduce motor vehicle use and increase transit ridership by encouraging local governments and transit agencies to cooperate in planning and promoting high density, mixed use developments in the area of transit stations.

Background

Land use patterns play a critical role in determining both transportation need and choice of transportation mode. The Bay Area is embarking upon a regional rail extension program, including significant expansion of the BART, Caltrain and Tasman light rail systems (see TCM #4). Total cost of the new rail starts program will exceed $3.5 billion.

Land use measures should be developed to derive the maximum benefit and use from this investment. Benefits of densification near transit stations will include improved air quality and personal mobility, increased transit ridership, reduced traffic congestion, higher local tax revenues, and conservation of open space.

Description

Cities and counties will be encouraged to cooperate with transit agencies in planning for high density, mixed use cluster development, including child care facilities.

Project design should emphasize pedestrian and bicycle access to transit, and mixed use facilities (housing, jobs, commercial) that minimize motor vehicle use.

Travel Market Affected

By providing housing, jobs, and retail and commercial facilities within close proximity to transit, TCM #18 will reduce motor vehicle use for all types of trips--commuting, shopping, recreational, personal business, etc.

Effectiveness

TCM #18 is expected to reduce emissions in Phase 2 as follows:

RHC	NOx	CO
0.05%	0.05%	0.05%

Cost

Annual cost of TCM #18 is estimated at $500,000 to prepare site plans for transit stations.

Implementation

MTC will assess the impact of a transit-oriented development pattern for the Bay Area as part of its Regional Transportation Plan (RTP) EIR.

MTC will seek funding to enable local governments to prepare specific area plans for transit stations, in cooperation with transit agencies.

Joint development opportunities should be explored as part of all rail planning studies.

The Air District will encourage cities and counties to plan for high density, mixed use development near transit via this measure, as well as TCM 16 (indirect source review) and TCM 19 (air quality elements in local General Plans).

Impediments

There are several potential impediments to full implementation of TCM #18:

- MTC must secure additional funding to complete its New Rail Starts program in an expeditious manner;
- there may be local opposition to the concept of increasing density in the vicinity of transit stations;
- funding must be secured to facilitate the preparation of site specific plans for transit stations.

Other Impacts

By increasing density around transit stations and thus reducing the need for motor vehicle travel, TCM #18 will help to reduce traffic congestion, fuel consumption, motor vehicle depreciation and wear and tear, and costs of maintaining the existing road system. Benefits in terms of travel time savings are expected to total $3.5 million per year.

The measure will also reduce the need for new roadway expansion, and significantly increase personal mobility, especially among transit-dependent elements of the population. This measure should also help to preserve open space in the Bay Area by reducing the need to convert rural land for housing and jobs.

TCM #18 should also mean increased revenue for both local governments and transit operators. Transit operators will benefit from higher fare box revenues and increased income from property rights at transit stations. Local governments will reap increased property and sales tax revenues due to enhanced economic activity and higher property values in the vicinity of transit stations.

Although increasing the density of development near transit stations should produce the positive results described above, it may create negative impacts on a localized basis by increasing emissions and traffic congestion in the immediate area. Site plans must be designed to minimize these localized impacts and to consider the compatibility of various land uses.

TCM #19 - AIR QUALITY ELEMENT FOR GENERAL PLANS

Purpose

This measure encourages all cities and counties to include an Air Quality Element in their General Plan to ensure that air quality issues are integrated into local planning and decision-making.

Background

Local plans and policies regarding land use, housing, employment, growth management, transportation and parking have a tremendous impact on regional air quality.

The Air District adopted Resolution 1666 in May 1986 urging local governments to incorporate Air Quality Elements into their General Plans. To date, approximately 30 cities and counties have complied.

Description

Cities and counties should include an Air Quality Element in their General Plan. The Air Quality Element should identify air quality problems facing the community, as related to the regional Clean Air Plan. The General Plan should promote consistency between the Air Quality Element, the Circulation/Transportation Element, the Land Use Element and other relevant elements. Goals should include jobs/housing balance, local policies to promote transit and ridesharing, high density zoning in the vicinity of transit stations, and limits on parking to reduce dependence on automobile use.

TCM #19 is a Phase 1, implementation support measure. TCM #19 complements TCMs 16 and 18.

Travel Market Affected

Local planning to improve air quality and reduce motor vehicle travel will address all types of trips--commute travel, shopping, school trips, recreation, personal business, commercial trips.

Effectiveness

No direct emission reductions are claimed for TCM #19. However, this measure should reduce emissions over the long term by promoting sound planning and policies at the local level and by supporting the implementation of the other TCMs in the Clean Air Plan.

Cost

TCM #19 has an estimated region-wide cost of $2 million per year to develop and update local Air Quality Elements.

Implementation

The Air District will expand its efforts to work with cities and counties on the preparation of Air Quality Elements, beginning in FY 1991-92.

The Air District will revise Chapter X, "Local Air Quality Elements," of its Air Quality and Urban Development Guidelines.

The Air District will require adoption of a local Air Quality Element as a condition for delegation of indirect source control (TCM 16) to local agencies.

The Air District will support State legislation to mandate that an Air Quality Element be included in local General Plans.

Impediments

The need for funding and staff time for local governments to prepare Air Quality Elements is the major obstacle to full implementation of TCM #19.

Other Impacts

By encouraging cities and counties to consider air quality when developing local plans and policies, TCM #19 should foster local decision-making to promote reduced traffic congestion and noise; improved mobility; balance between jobs and housing; compact land use policies that preserve open space and minimize the cost of providing local services; and viable local and regional transit services. Such policies can be expected to have a positive effect on local quality of life and local government finance.

TCM #20 - CONDUCT DEMONSTRATION PROJECTS

Purpose

This measure will promote demonstration projects to encourage innovative approaches to reduce motor vehicle travel and mobile source emissions.

Background

Transportation demand management and transportation control measures are relatively new concepts in air quality planning. Despite recent progress, much work remains to be done in terms of testing new approaches and monitoring their effectiveness, quantifying emission reductions and travel benefits, and evaluating the synergistic effects of complementary measures. It is important to encourage demonstration projects which can serve as models for trip reduction and travel demand efforts throughout the region.

Description

This measure would undertake various demonstration projects and studies to further develop strategies that will ultimately be required to help achieve State air quality standards. Examples are as follows:

- Telecommuting

  To evaluate opportunities and constraints associated with telecommuting, this measure will consist of demonstration projects involving partnerships with the business community. Some key issues include:

  - employer willingness to permit telecommuting
  - percentage of employees whose work is amenable to telecommuting options
  - percentage of employees who would choose to telecommute on a long-term basis

- Congestion Pricing / Electronic License Plate Evaluation

  A regionwide congestion pricing scheme that extends electronic toll collection concepts beyond the toll bridge plazas will need to address several key issues:

  - the technology such that cars could be monitored electronically and "billed" for their use of roadways
  - an implementation strategy that would not divert traffic from facilities that are priced to facilities which are not
  - an administrative operating plan for billing and fund collection

- Electric or natural gas carpools

  A demonstration project with interested employers would consist of operating alternative fuel carpools; such a project would provide a test market to see how these vehicle perform in day-to-day commute service and help manufacturers expand the market interest

Travel Market Affected

The proposed demonstration projects would directly effect only a very small percentage of travel in the region. However, the experience gained through these projects will be of great benefit in developing policies and programs that affect all types of travel in the region, including commuting, shopping, recreation and personal business, and commercial travel.

Effectiveness

Because demonstration projects are small-scale, no direct emission reductions are claimed for TCM #20. However, demonstration projects should contribute to reduced emissions by providing tested models to use in crafting effective programs on a region-wide basis. Successful demonstration projects will encourage both the public and private sectors to invest resources in expanded programs.

Cost

Annual cost of TCM #20 is estimated at $500,000.

Implementation

The Air District and MTC will cooperate with employers and public agencies such as Caltrans and FHWA in developing demonstration projects.

- MTC has submitted a grant proposal to the Federal Highway Administration (FHWA) to establish a telecommuting prototype project in the Bay Area. If the proposal is approved in full, MTC will sponsor establishment of up to three telecommuting centers in the region.
- The Air District will seek private sponsors for telecommuting centers.
- Additional projects will be developed to assess the use of electronic systems for toll collection and for congestion pricing of roadways, and to promote use of alternate fuel vehicles.
- Other demonstration projects may be developed if funding is available.

Impediments

The Air District and MTC will need to secure additional revenue to assure full implementation of TCM #20. If legislation to fund the mobility package is approved (see TCM 21), a portion of this funding could be allocated to demonstration projects. AB 434 funds may be available for demonstration projects. Some funding for demonstration projects may also be forthcoming from State and Federal agencies and from the private sector.

Other Impacts

The demonstration projects in TCM #20 could have considerable impacts beyond air quality, if implemented on a widespread basis. Telecommuting has the potential to bring about a major change in work culture, productivity, lifestyle, travel patterns, etc. Congestion pricing of roadways could cause substantial changes in trip scheduling, trip routing, travel mode, choice of home and work location, and siting of new residential and commercial construction. Widespread introduction of alternative fuel vehicles can be expected to affect fuel use and distribution systems.

TCM #21 - IMPLEMENT REVENUE MEASURES

Purpose

TCM #21 is designed to secure additional revenue needed to fully fund the mobility improvement measures in the TCM plan.

Background

We cannot expect people to significantly reduce auto travel unless they have access to viable alternatives in the form of improved and expanded transit service, high occupancy vehicle lanes, vanpools, and bicycle and pedestrian facilities. The TCM plan therefore contains a set of measures, collectively referred to as the "mobility package," to improve options to the single occupant automobile. Although partial funding is currently available for most projects, MTC estimates that additional revenues of $500-$600 million per year are needed to fully fund the mobility measures.

Description

The preferred revenue sources for the mobility package are increases in bridge tolls, motor vehicle registration fees and gas taxes.

- Two revenue measures have already been approved and implemented. These are Federal TCM 13 (Increase bridge tolls to $1.00 on all bridges) and Federal TCM 15 (Increase state gas tax by $.09 per gallon). The bridge toll increase generates annual revenues of $38 million for capital investment on new rail projects, as well as congestion relief projects such as ferry and bicycle improvements.

Two additional measures are currently under consideration in Sacramento. These are:

- AB 434, which would increase motor vehicle registration fees by up to $4 per vehicle. This measure would generate approximately $16 million per year.

- SB 210, as currently written, would increase tolls on the three southern bridges (Bay Bridge, Dumbarton Bridge, San Mateo Bridge) from $1 to $2. This measure would generate approximately $52 million per year. The money would be earmarked to fund bus/rail transfers, expanded transit in the bridge corridors, congestion relief, and a regional toll-free transit information number.

Prospects are good for approval of both bills during Phase 1.

The final element of the revenue package calls for an increase in the gas tax by $.14 per gallon or an equivalent revenue-generating measure. This measure is critical, as it would provide an estimated $420 million per year--the bulk of the revenue needed to fund the mobility improvements. Depending upon the legislative process, this measure is not likely to be implemented before Phase 2.

Travel Market Affected

TCM #21 will affect all types of travel, including commuting, shopping, recreation and personal business, and commercial travel.

Effectiveness

The primary purpose of TCM 21 is to generate revenue to fund the mobility package. However, by increasing the cost of driving, TCM #21 will cause a significant reduction in vehicle trips and miles driven and in vehicular emissions. Anticipated emission reduction are as follows:

	RHC	NOx	CO
Phase 1	1.20%	1.25%	1.17%
Phase 2	0.60%	0.65%	0.60%
Total	1.80%	1.90%	1.77%

Cost

Revenue measures to fund the mobility package are projected to raise $500-$600 million per year. However, these costs are not attributed to TCM #21, because they are included in the cost estimates for those TCMs that comprise the mobility package.

Implementation

MTC and the Air District will cooperate to secure approval of revenue measures in the 1991-92 State legislative session. Support from the business community and environmental groups will be needed.

Impediments

Although prospects for approval of AB 434 and SB 210 are good, approval of legislation to authorize a regional gas tax increase of $.14 per gallon may prove to be difficult. Without approval of this measure (or an equivalent revenue-generating measure), full implementation of the mobility improvement package will be compromised.

Other Impacts

TCM #21 has a dual effect; it generates revenue to fund the mobility package and it reduces emissions by raising the cost of driving. By reducing vehicle trips and vehicle miles traveled, TCM #21 will have a significant impact in terms of reducing traffic congestion, fuel consumption, motor vehicle depreciation and wear and tear on the region's roadway network. By reducing congestion and delays, TCM #21 is expected to provide travel time savings valued at $90 million per year.

TCM #22 - IMPLEMENT MARKET-BASED PRICING MEASURES

Purpose

TCM #22 is intended to reduce motor vehicle emissions and traffic congestion through a combination of pricing measures, including "smog-based" vehicle registration fees, higher gas taxes, parking charges for both work and non-work facilities, and "congestion pricing" on major roadways.

Background

There is growing acknowledgement that solutions to air quality and traffic congestion problems depend upon basic changes in the way that transportation is funded and priced in America. The costs of owning and operating an automobile are much lower in the United States than in any other developed nation. The low cost of driving and the substantial public investment in roads and highways combine to stimulate motor vehicle travel, while discouraging the use of alternative modes such as transit. Enormous growth in vehicle ownership and vehicle miles traveled (VMT) over the past several decades has impeded attainment of air quality standards and led to increasingly severe traffic congestion in the Bay Area.

Over the past several years, support has grown for measures to increase the cost of driving and to implement "congestion pricing" as a means to better distribute travel in terms of time and route. This support spans a diverse range of interests, including business and environmental groups. Advocates of pricing measures point out that these measures effect the full spectrum of vehicle users and trip purposes.

The cost of driving includes both ownership costs (purchase, interest, insurance and registration) and operating costs (fuel, tolls, parking, etc). Ownership costs are "fixed" costs, while operating costs are "variable." Automobile owners are primarily influenced by variable operating costs in making daily travel decisions. Therefore, increases in variable costs are most effective in reducing motor vehicle use.

Although pricing measures offer strong potential for reducing air pollution and congestion, these measures must be implemented in conjunction with policies to ensure that pricing measures do not place an undue burden on low income households.

Description

The Air District and MTC will seek expeditious approval of legislation needed to implement pricing measures. The specific details of the pricing measures will be determined through the process of drafting and securing approval of the legislation.

TCM 22 actually consists of five distinct pricing strategies. The assumptions used for modeling purposes are described below:

> **TCM 22a - Smog-based Vehicle Registration Fees**. Vehicle registration fees would be based on the calculated annual emissions from each vehicle, derived from the odometer reading and a representative measurement of tailpipe emissions. Fees would range from $20 per year to over $1000 per year, depending on the vehicle and its pattern of use. Total revenue from 22a would be approximately $500 million per year, an average of about $125 per vehicle.

TCM 22b - Regionwide Freeway and Arterial Congestion Pricing. An automatic vehicle identification (AVI) system would be used to price the regional freeway and arterial system to maintain level of service (LOS) standard D/E. Minimum freeway speeds under a fully operational system would be about 40 miles per hour. Fees would average $0.10 per mile. Total revenue from this measure is estimated at $354 million per year (about $90 per vehicle).

TCM 22c - Regionwide Non-Work Parking Charge of $0.60 per Hour. All non-residential, non-work parking lots and on-street spaces in commercial districts would be priced at $0.60 per hour, with a $3.00 per day maximum (except in areas where prevailing market rates already exceed these rates). This measure is expected to generate annual revenues of $690 million, an average of about $170 per vehicle.

TCM 22d - Gas Tax Increase of $2 per Gallon. Over a ten year period, gas taxes would be gradually increased by a total of $2 per gallon. This would bring those taxes to a level consistent with other developed countries (Western Europe, Japan). At full implementation, this measure would generate revenues of approximately $1.8 billion per year, or about $450 per vehicle.

TCM 22e - Regionwide Worksite Parking Charges of $3.00/day. Parking spaces at employment sites would be priced at $3.00 per day. (Emissions reductions are not claimed for this measure, because the emissions reduction estimate for TCM 2, Employer-based Trip Reduction Program, assumes a program based on performance standards equivalent to a $3.00/day parking charge with revenues used to provide incentives for transit, ridesharing, and other alternate commute modes.)

Each of the measures would have a major impact on reducing motor vehicle emissions. However, they would achieve this effect in different ways. While the gas tax increase and the parking fees would operate by reducing vehicle trips and VMT, congestion pricing would operate primarily by shifting trips temporally and spatially so as to reduce congestion-related emissions. The smog-based vehicle registration fees would operate by encouraging drivers to trade high-emitting vehicles for cleaner ones. Both the congestion pricing and the smog-based registration fees would therefore reduce vehicular emissions much more than they would reduce vehicle trips and VMT (see Table 4 in Clean Air Plan).

Travel Market Affected

Market-based measures would effect all types of travel, including commuting, commercial trips, shopping, personal business, and social and recreational travel.

Intra-regional travel would probably be more impacted than inter-regional travel, since vehicles passing through the Bay Area would escape many of the pricing measures, such as "smog-based" registration fees, parking charges and increased gas taxes.

Effectiveness

Based on these assumptions, TCM #22 would produce the following emissions reductions:

	RHC	NOx	CO
TCM 22a	4.5%	1.2%	4.5%
TCM 22b	5.5%	2.9%	7.5%
TCM 22c	4.6%	4.5%	5.1
TCM 22d	7.8%	7.8%	7.6%
Combined	20.6%	15.5%	22.5%

These estimates are based solely on the impact of pricing measures as a disincentive to driving. If most of the revenues generated by market-based measures are allocated to improve transit and to fund user incentives for transportation alternatives, TCM #22 will have a greater impact on emissions than shown above.

In addition to providing substantial emission reductions, the market-based measures will be critical for achieving CCAA transportation performance standards.

Cost

Based on the assumptions described above, the pricing measures would generate revenues of approximately $3.3 billion per year. Pricing measures would obviously entail substantial out-of-pocket expenses for many drivers, especially those who are either unable or unwilling to shift to alternatives to the single occupant vehicle. But these expenses represent "transfer payments" rather than true "costs." Since the revenues generated through the market-based measures would be used to fund expansion of transit and provide rebates to low income groups, they represent a transfer of resources, not a net "cost" to society.

Implementation

The Air District and MTC will pursue legislation for the pricing measures in Phase 1. Implementation is scheduled for Phase 2. The legislative package would provide details regarding the following elements.

- Low fees would be set initially (comparable to fees in TCM #21 - Revenue Measures); fees would increase as transportation alternatives become more available.
- Revenue from the pricing measures would be used to fund transportation alternatives in the Bay Area that yield the greatest air quality benefits.
- Revenue from the pricing measures would also be used to establish a specific fund and/or programs to address economic impacts on low income households. Examples include subsidized transit passes, improved transit service, and income tax credits.

Bay Area business associations and environmental organizations have expressed support for pricing measures. Their support will be needed to secure legislation authorizing pricing measures.

Public education will be necessary to promote understanding and acceptance of pricing measures as a primary solution to the region's air quality and congestion problems.

Impediments

Opposition to measures that would substantially increase the cost of owning and operating a motor vehicle are likely to be the greatest obstacle to implementation of TCM #22. A major increase in gas taxes and implementation of congestion pricing of roadways may prove to be particularly controversial.

Measures to mitigate the impact of pricing measures on low income groups will be essential. It will also be important to educate the public and decision-makers about the considerable inequities in the current system of transportation financing in order to build support for an alternative financing system based on the proposed pricing measures.

Other Impacts

In addition to substantially reducing vehicular emissions, TCM #22 would greatly reduce vehicle trips, vehicle miles traveled, and traffic congestion. Based on the modeling assumption described above, TCM #22 would achieve a 14.6% reduction in motor vehicle trips and a 13.7% decrease in vehicle miles traveled compared to levels projected for the year 2000. (Reductions in vehicle trips and VMT are broken down for each component of TCM 22 in Table 4 of the Clean Air Plan.)

The reduction in traffic congestion would be greater than the reduction in vehicle trips, because congestion pricing measures would serve to better distribute traffic. It should be noted that, under congested conditions, removal of relatively few vehicles from the road yields a significant reduction in congestion. Benefits in terms of travel time savings from TCM #22 as a whole are estimated at approximately $1.24 billion per year.

The above estimates are based solely on the effect of market-based measures as a disincentive to driving. If the revenues generated by pricing measures is used to improve and expand transit, this would produce even greater reductions in vehicle travel and emissions.

TCM 22 would also have a tremendous impact on fuel consumption, primarily due to large increase in gas taxes, which would induce manufacturers and consumers to shift toward more fuel-efficient vehicles. Total fuel savings for TCM 22 are projected at 46.5%, if the entire gas tax increase is approved and implemented.

TCM #22 would produce other beneficial effects, including:

- reduced vehicular depreciation and wear and tear
- reduced maintenance costs on the regional roadway network

- reduced demand for new and expanded roads and highways
- decreased water pollution from motor vehicles
- reduced emissions of pollutants that are not specifically addressed in the Clean Air Plan, including toxics, particulates and global warming gases.

TCM #23 - OZONE EXCESS "NO DRIVE DAYS" (VOLUNTARY)

Purpose

The purpose of this measure is to reduce violations of the State ozone standard by reducing motor vehicle emissions on days when an ozone exceedance is predicted. The measure could also be employed in the winter on forecast carbon monoxide excess days.

Description

This is an intermittent, voluntary program to encourage Bay Area residents to reduce motor vehicle use on days when the State ambient ozone standard is predicted to be exceeded. Vehicle use can be reduced by eliminating unnecessary trips, combining trips (trip linking), or shifting auto trips to alternative modes of transportation.

TCM 23 represents a new approach for reducing emissions. The program is based on the philosophy that each individual can play an important role in improving air quality. The Bay Area is noted for its strong environmental ethic. This measure seeks to build on the success of voluntary efforts to conserve water, expand recycling, etc. The key is to translate information into individual action. Together with the measures in TCMs 1-22, this approach will reduce violations and speed attainment of ambient air quality standards.

This measure is related to CM# G1, Citizen Postponement Of Discretionary Activities, which calls for individuals to curtail or postpone other activities that produce emissions on days when exceedances are predicted. The triggering mechanisms and at least part of the information broadcasting system would be the same for TCM 23 and CM # G1. It is also related to TCM 17, the public education campaign.

Travel Market Affected

This measure primarily targets commute trips, school trips and discretionary travel such as shopping, recreation and personal business.

Implementation

Implementation of this measure began in September 1991 as part of the District's "Voluntary Curtailment" program.

The Meteorology and Data Analysis Section of the District's Technical Division routinely makes forecasts for each criteria pollutant. Forecasts are made a day in advance. For example, the forecast for Wednesday is issued by 4:00 pm on Tuesday.

On days when ozone concentrations are forecast to reach 0.09 ppm, a notice is issued to the print and electronic media. The notice indicates that ozone levels are predicted to exceed the level of the ambient standard and asks the public to eliminate unnecessary trips, combine trips, and shift trips from automobiles to alternative modes of transportation.

Employers can assist in implementation of this measure by helping their employees to plan alternative transportation arrangements to be used whenever an exceedance is predicted.

Effectiveness

Initial experience with this program in September 1991 suggests that it has the potential to achieve significant reductions on days when exceedances are predicted. The District has received widespread cooperation from Bay Area media in implementing the Voluntary Curtailment program.

Because TCM 23 relies on voluntary compliance, there is no enforcement mechanism or accurate means of measuring compliance. Therefore, emission reductions are not claimed for this measure in the Clean Air Plan. Although total annual emissions reductions may be relatively small, reductions during high ozone days may be significant. With a compliance rate of 5%, emission reductions would be 7 tons/day of reactive hydrocarbons and 11 tons/day of nitrogen oxides.

Costs of Control

No costs are associated with this control measure in the traditional sense of control costs, although an increased load on public transportation systems is expected to occur on 10-20 days per year.

Dissemination of information through regional media, which is key to successful implementation, entails no significant costs.

Other Impacts

One of the most important, though intangible, benefits of this measure will be raising the awareness of the public.

Although TCM 23 is confined to intermittent periods, it may have a broader impact. People who choose to change their travel behavior in response to the Voluntary Curtailment program may continue to reduce vehicle use on a regular basis, even if exceedances are not predicted.

Reductions in trips and VMT would also produce benefits in terms of energy conservation, traffic congestion relief, etc.